

=> fil reg  
 FILE 'REGISTRY' ENTERED AT 10:16:05 ON 18 MAR 2010  
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STRUCTURE FILE UPDATES: 17 MAR 2010 HIGHEST RN 1211109-76-0  
 DICTIONARY FILE UPDATES: 17 MAR 2010 HIGHEST RN 1211109-76-0

New CAS Information Use Policies, enter HELP USAGETERMS for details.

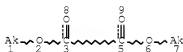
TSCA INFORMATION NOW CURRENT THROUGH January 8, 2010.

Please note that search-term pricing does apply when  
 conducting SmartSELECT searches.

REGISTRY includes numerically searchable data for experimental and  
 predicted properties as well as tags indicating availability of  
 experimental property data in the original document. For information  
 on property searching in REGISTRY, refer to:

<http://www.cas.org/support/stngen/stndoc/properties.html>

=> d que 187  
 L16 STR



NODE ATTRIBUTES:  
 CONNECT IS E1 RC AT 1  
 CONNECT IS E1 RC AT 7  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 8

STEREO ATTRIBUTES: NONE  
 L18 593 SEA FILE=REGISTRY SSS FUL L16  
 L20 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "1,3-PROPANE  
 SULTONE"/CN  
 L21 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "VINYLENE  
 CARBONATE"/CN  
 L22 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL ETHYL  
 OXALATE"/CN  
 L23 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL PROPYL  
 OXALATE"/CN  
 L25 7 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND C7H12O4/M  
 F  
 L26 6 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L25 AND METHYL?

L27 43 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND HEXYL?  
 L28 11 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND METHYL?  
 L29 0 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND 1-METHYL?  
  
 L30 5 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND 2-METHYL?  
  
 L31 15 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND HEPTYL?  
 L32 13 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND OCTYL?  
 L33 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND NONYL?  
 L34 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND DECYL?  
 L35 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND UNDECYL?  
  
 L36 11 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND DODECYL?  
  
 L44 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON COLIO2/MF  
 L45 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON LIMN2O4/MF  
 L46 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON LINIO2/MF  
 L47 462 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON (LI(L)CO(L)NI(L)O  
 )/ELS(L)4/ELC.SUB  
 L49 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON GRAPHITE/CN  
 L50 231065 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L49 OR GRAPHITE#  
 L51 1607 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L21  
 L52 2339 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L20  
 L55 6008 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L18  
 L56 QUE SPE=ON ABB=ON PLU=ON ELECTROLYTE#  
 L57 QUE SPE=ON ABB=ON PLU=ON NONAQUEOUS? OR NON AQUEOUS?  
 L58 QUE SPE=ON ABB=ON PLU=ON L22 OR L23 OR (L26 OR L27 OR  
 L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR  
 L36)  
 L59 3 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57 AND  
 L58  
 L60 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57 AND  
 L55  
 L61 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L59 OR L60  
 L62 6 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L61 AND L52  
 L63 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L62 AND L51  
 L64 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON (L59 OR L60 OR  
 L61 OR L62 OR L63)  
 L65 QUE SPE=ON ABB=ON PLU=ON (L44 OR L45 OR L46 OR L47)  
 L66 3 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 AND L65  
 L67 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 AND L50  
 L68 QUE SPE=ON ABB=ON PLU=ON ANODE# OR NEGATIVE ELECTRODE  
 #  
 L69 QUE SPE=ON ABB=ON PLU=ON CATHODE# OR POSITIVE ELECTRO  
 DE#  
 L70 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 OR L66 OR L67  
  
 L71 7 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 AND (L68 OR  
 L69)  
 L72 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 OR L71  
 L87 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L72 AND (1840-2006  
 )/PRY,AY,PY

=> fil hcap

FILE 'HCAPLUS' ENTERED AT 10:16:22 ON 18 MAR 2010

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

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FILE COVERS 1907 - 18 Mar 2010 VOL 152 ISS 12  
 FILE LAST UPDATED: 17 Mar 2010 (20100317/ED)  
 REVISED CLASS FIELDS (/NCL) LAST RELOADED: Dec 2009  
 USPTO MANUAL OF CLASSIFICATIONS THESAURUS ISSUE DATE: Dec 2009

HCAplus now includes complete International Patent Classification (IPC) reclassification data for the first quarter of 2010.

CAS Information Use Policies apply and are available at:

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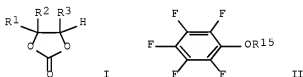
This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d 187 1-14 ibib ed abs hitstr hitind

L87 ANSWER 1 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2006/734562 HCAPLUS Full-text  
 DOCUMENT NUMBER: 145:191970  
 TITLE: Nonaqueous electrolyte  
 solution and secondary lithium battery using the  
 solution  
 INVENTOR(S): Abe, Koji; Kuwata, Takaaki  
 PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan  
 SOURCE: PCT Int. Appl., 47 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006077763	A1	20060727	WO 2006-JP300278	20060112
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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
IN 2007CN03175	A	20070907	IN 2007-CN3175	20070719

KR 2007097072	A	20071002	KR 2007-716598		20070719
US 20090053598	A1	20090226	US 2007-814372		20070720
PRIORITY APPLN. INFO.:			JP 2005-12728	A	20050120
			JP 2005-12729	A	20050120
			WO 2006-JP300278	W	20060112
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT					
OTHER SOURCE(S): MARPAT 145:191970					
ED Entered STN: 27 Jul 2006					
GI					



AB The electrolyte solution has an electrolyte salt dissolved in a nonaq. solvent; where the electrolyte solution further contains 0.1-10 weight% ethylene carbonate derivative I (R1-3 = H, halo, C2-12 alkenyl, C2-12 alkynyl, or C6-18 aryl group), and 0.01-10 weight% triple bond-containing compound and/or a pentafluorophenyl oxy compound II (R15 = C2-12 alkyl carbonyl, C2-12 alkoxy carbonyl, C7-18 aryloxy carbonyl, or C1-12 alkane sulfonyl group; and  $\geq 1$  H atom in R15 is substituted by halo atom or C6-18 aryl group). The battery has a cathode containing a Li composite oxide, an anode containing graphite, and the above electrolyte solution

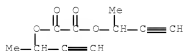
IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
(electrolyte solns. having ethylene carbonate derivs. and pentafluorophenyl oxy compds. and/or triple bond-containing compds. for secondary lithium batteries)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	1	7440-48-4
Li	1	7439-93-2

IT	417706-30-0	(electrolyte solns. having ethylene carbonate derivs. and pentafluorophenyl oxy compds. and/or triple bond-containing compds. for secondary lithium batteries)
RN	417706-30-0	HCAPLUS
CN	Ethanedioic acid, 1,2-bis(1-methyl-2-propyn-1-yl) ester	(CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary battery electrolyte ethylene carbonate deriv  
pentafluorophenyl oxy compd; battery electrolyte triple bond  
contg compd

IT Battery electrolytes  
(electrolyte solns. having ethylene carbonate derivs. and  
pentafluorophenyl oxy compds. and/or triple bond-containing compds. for  
secondary lithium batteries)

IT Secondary batteries  
(lithium; electrolyte solns. having ethylene carbonate  
derivs. and pentafluorophenyl oxy compds. and/or triple bond-containing  
compds. for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 623-53-0,  
Methyl ethyl carbonate 12190-79-3, Cobalt lithium oxide  
(CoLiO2) 21324-40-3, Lithium hexafluorophosphate 39361-75-6,  
Cobalt zirconium oxide 346417-97-8, Cobalt lithium manganese nickel  
oxide (Co0.33LiMn0.33Ni0.33O2)  
(electrolyte solns. having ethylene carbonate derivs. and  
pentafluorophenyl oxy compds. and/or triple bond-containing compds. for  
secondary lithium batteries)

IT 98-06-6, tert-Butyl benzene 536-74-3, Phenyl acetylene 827-52-1,  
Cyclohexyl benzene 2049-95-8 4427-96-7, Vinyl ethylene carbonate  
7310-92-1 13702-09-5 14283-07-9, Lithium tetrafluoroborate  
16156-58-4, 2-Propynyl methane sulfonate 19220-93-0,  
Pentafluorophenyl acetate 26842-65-9 32042-39-0 61764-71-4,  
Methyl 2-propynyl carbonate 79493-91-7, Dipropargyl carbonate  
90076-65-6 114435-02-8, Fluoroethylene carbonate 161912-36-3  
197244-15-8 406725-07-3 417706-30-0 902243-09-8  
(electrolyte solns. having ethylene carbonate derivs. and  
pentafluorophenyl oxy compds. and/or triple bond-containing compds. for  
secondary lithium batteries)

IT 2917-96-6  
(example; electrolyte solns. having ethylene carbonate  
derivs. and pentafluorophenyl oxy compds. and/or triple bond-containing  
compds. for secondary lithium batteries)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS  
RECORD (3 CITINGS)

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
RE FORMAT

L87 ANSWER 2 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2005:1292320 HCAPLUS Full-text

DOCUMENT NUMBER: 144:38333

TITLE: Nonaqueous electrolyte  
solution for secondary lithium battery

INVENTOR(S): Abe, Koji; Miyoshi, Kazuhiro; Kuwata, Takaaki

PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan

SOURCE: PCT Int. Appl., 45 pp.  
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005117197	A1	20051208	WO 2005-JP9900	20050530
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RW:	BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
CA 2568519	A1	20051208	CA 2005-2568519	20050530
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EP 1772924	A1	20070411	EP 2005-743834	20050530
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R:	AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, AL, BA, HR, LV, MK, YU			
CN 1989647	A	20070627	CN 2005-80024923	20050530
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CN 100474688	C	20090401		
US 20070231707	A1	20071004	US 2006-597652	20061127
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US 7629085	B2	20091208		
ZA 2006010287	A	20081029	ZA 2006-10287	20061208
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KR 2007024663	A	20070302	KR 2006-727547	20061228
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IN 2006CN04771	A	20070629	IN 2006-CN4771	20061228
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PRIORITY APPLN. INFO.:			JP 2004-159283	A 20040528
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			WO 2005-JP9900	W 20050530
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OTHER SOURCE(S): MARPAT 144:38333

ED Entered STN: 09 Dec 2005

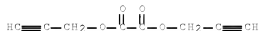
AB The electrolyte solution contains an electrolyte salt in a nonaq. solvent and contains 0.01-10% S acid ester and 0.01-10% triple bond compound of the formula R1(C.tplbond.C)pR2, R3C.tplbond.C(CR4R5)xOY1, Y2O(CR6R7)xC.tplbond.C(CR8R9)xOY3, Y4O(CR10R11)xC.tplbond.CC.tplbond.C(CR12R13)xOY5, R14C.tplbond.C(CR15R16)xOCO2(CR17R18)xC.tplbond.CR19 or R20C.tplbond.C(CR21R22)xOWOY6 where R1 = C1-12 alkyl, C3-6 cycloalkyl, or aryl group; R2-R22 = H or C1-12 alkyl, C3-6 cycloalkyl, or aryl groups, p = 1 or 2, x = 1 or 2; R4 and R5, R6 and R7, R8 and R9, R10 and R11, R12 and R13, R15 and R16, R17 and R18, and R21 and R22 may form C3-6 cycloalkyl groups; W = -SO-, -SO2-, -COCO-, and the Y's are carboxylate ester, alkyl carbonyl, or alkyl sulfonyl groups.

IT i120-71-4, Propanesultone 71573-77-8,  
Di(2-propynyl) oxalate 870861-60-2  
(sulfur acid ester and alkyne compound additives in nonaq.  
electrolyte solns. for secondary lithium batteries)

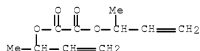
RN 1120-71-4 HCAPLUS  
 CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



RN 71573-77-8 HCAPLUS  
 CN Ethanedioic acid, 1,2-di-2-propyn-1-yl ester (CA INDEX NAME)



RN 870861-60-2 HCAPLUS  
 CN Ethanedioic acid, 1,2-bis(1-methyl-2-propen-1-yl) ester (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-02; H01M004-38; H01M004-58; H01M004-66  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery electrolyte sulfur acid ester  
 alkyne compd  
 IT Battery electrolytes  
     (sulfur acid ester and alkyne compound additives in nonaq.  
     electrolyte solns. for secondary lithium batteries)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 623-53-0, Methyl ethyl carbonate 21324-40-3, Lithium  
 hexafluorophosphate  
     (sulfur acid ester and alkyne compound additives in nonaq.  
     electrolyte solns. for secondary lithium batteries)  
 IT 536-74-3, Phenylacetylene 1072-53-3 1120-71-4,  
 Propanesultone 1633-83-6, Butanesultone 1899-25-8 3741-38-6,  
 Glycol sulfite 16156-58-4, 2-Propynyl methanesulfonate 19828-82-1  
 19828-83-2 29619-56-5 61764-71-4 70886-56-5 71573-77-8  
 , Di(2-propynyl) oxalate 406725-07-3 530158-20-4  
 870861-60-2  
     (sulfur acid ester and alkyne compound additives in nonaq.  
     electrolyte solns. for secondary lithium batteries)  
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS  
 RECORD (3 CITINGS)  
 REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN THE

## RE FORMAT

L87 ANSWER 3 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2005:732891 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:214335  
 TITLE: Nonaqueous electrolyte  
 solution, secondary lithium battery, and operation  
 of the battery  
 INVENTOR(S): Abe, Koji  
 PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan  
 SOURCE: PCT Int. Appl., 23 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005074067	A1	20050811	WO 2005-JP1424	20050201
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CA 2555192	A1	20050811	CA 2005-2555192	20050201
CN 1938894	A	20070328	CN 2005-80010139	20050201
US 20070148554	A1	20070628	US 2006-588063	20060801
KR 2006129042	A	20061214	KR 2006-717663	20060831
IN 2006CN03177	A	20070608	IN 2006-CN3177	20060901
PRIORITY APPLN. INFO.:			JP 2004-25834	A 20040202
			WO 2005-JP1424	W 20050201

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 12 Aug 2005  
 AB The electrolyte solution has an electrolyte dissolved in a nonaq. solvent and contains 1-10% cyclohexylbenzene derivative with halogenated benzene rings and 0.1-5% fluorobenzene derivative. The battery uses the above electrolyte solution containing several cyclic carbonates as electrolyte solution. The battery is operated with a maximum operational voltage  $\geq 4.2$  V.  
 IT 615-52-1 872-36-6, Vinylene carbonate  
 1120-71-4, 1,3-Propanesultone  
 (electrolyte solns. containing halogenated cyclohexylbenzene and fluoroether derivs. for secondary lithium batteries)  
 RN 615-52-1 HCAPLUS  
 CN Ethanedioic acid, 1-ethyl 2-methyl ester (CA INDEX NAME)





RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 1120-71-4 HCAPLUS  
 CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery electrolyte halogenated  
 cyclohexylbenzene fluorobenzene deriv  
 IT Battery electrolytes  
 (electrolyte solns. containing halogenated cyclohexylbenzene  
 and fluorobenzene derivs. for secondary lithium batteries)  
 IT Secondary batteries  
 (lithium; secondary lithium batteries with electrolyte  
 solns. containing halogenated cyclohexylbenzene and fluorobenzene  
 derivs. and their operation method)  
 IT 96-49-1, Ethylene carbonate 615-52-1 623-53-0, Methyl  
 ethyl carbonate 872-36-6, Vinylene carbonate  
 1120-71-4, 1,3-Propanesultone 21324-40-3, Lithium  
 hexafluorophosphate  
 (electrolyte solns. containing halogenated cyclohexylbenzene  
 and fluorobenzene derivs. for secondary lithium batteries)  
 IT 452-10-8, 2,4-Difluoroanisole 462-06-6, Fluorobenzene 1717-84-6  
 (electrolyte solns. containing halogenated cyclohexylbenzene  
 and fluorobenzene derivs. for secondary lithium batteries)  
 OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS  
 RECORD (2 CITINGS)  
 REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
 RE FORMAT

L87 ANSWER 4 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2005:606347 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:100421  
 TITLE: Secondary lithium batteries having stable SEI

(solid electrolyte interface)  
 INVENTOR(S): Iwanaga, Masato; Inomata, Hideyuki; Oga, Keisuke;  
 Abe, Hiroshi; Miyoshi, Kazuhiro  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan; Ube Industries,  
 Ltd.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005190754	A	20050714	JP 2003-428675	20031225
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JP 4319025	B2	20090826		
WO 2005064735	A1	20050714	WO 2004-JP19328	20041224
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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CN 1890836	A	20070103	CN 2004-80035854	20041224
			<--	
CN 100446335	C	20081224		
KR 2006113738	A	20061102	KR 2006-712347	20060621
			<--	
US 20070178380	A1	20070802	US 2006-584266	20060623
			<--	
JP 2009117383	A	20090528	JP 2009-17885	20090129
			<--	
PRIORITY APPLN. INFO.:			JP 2003-428675	A 20031225
			<--	
			WO 2004-JP19328	W 20041224
			<--	

# ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 14 Jul 2005

AB The batteries employ carbonaceous anodes, and nonaq. electrolyte solns. containing 0.1-3 weight% of vinylene carbonate and 0.1-2 weight% of di(2-propynyl) oxalate (to the total electrolyte solns.). The batteries show high initial discharge capacity, excellent charge-discharge cycling performance at high temperature, and inhibit gas generation upon repeated usage.

IT 71573-77-8, Di(2-propynyl) oxalate  
 (additive for electrolyte solution; secondary Li battery containing carbonaceous anode and electrolyte solution containing gas-suppressing additives)

RN 71573-77-8 HCAPLUS

CN Ethanedioic acid, 1,2-di-2-propyn-1-yl ester (CA INDEX NAME)



IT 7782-42-5, Graphite, uses  
(anode; secondary Li battery containing carbonaceous  
anode and electrolyte solution containing  
gas-suppressing additives)

RN 7782-42-5 HCAPLUS

CN Graphite (CA INDEX NAME)

C

IC ICM H01M010-40  
ICS H01M002-02; H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery electrolyte soln additive vinylene  
carbonate; dipropynyl oxalate additive lithium battery  
electrolyte soln

IT Carbonaceous materials (technological products)  
(anode; secondary Li battery containing carbonaceous  
anode and electrolyte solution containing  
gas-suppressing additives)

IT Battery electrolytes  
Secondary batteries  
(secondary Li battery containing carbonaceous anode and  
electrolyte solution containing gas-suppressing additives)

IT 872-36-6, Vinylene carbonate 71573-77-8, Di(2-propynyl)  
oxalate  
(additive for electrolyte solution; secondary Li battery  
containing carbonaceous anode and electrolyte solution  
containing gas-suppressing additives)

IT 7782-42-5, Graphite, uses  
(anode; secondary Li battery containing carbonaceous  
anode and electrolyte solution containing  
gas-suppressing additives)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 616-38-6,  
Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
(in electrolyte solution; secondary Li battery containing  
carbonaceous anode and electrolyte solution containing  
gas-suppressing additives)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS  
RECORD (2 CITINGS)

L87 ANSWER 5 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2005:283755 HCAPLUS Full-text

DOCUMENT NUMBER: 142:358035

TITLE: Nonaqueous electrolyte  
solution and secondary lithium battery using the  
solution

INVENTOR(S): Abe, Koji; Kuwata, Takaaki

PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan

SOURCE: PCT Int. Appl., 26 pp.  
CODEN: PIXXD2

DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005029631	A1	20050331	WO 2004-JP13687	20040917
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EP 1672729	A1	20060621	EP 2004-773306	20040917
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR				
CN 1864299	A	20061115	CN 2004-80026823	20040917
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CN 100481604	C	20090422		
KR 2006076304	A	20060704	KR 2006-705312	20060316
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US 20070054185	A1	20070308	US 2006-572571	20060317
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US 7261975	B2	20070828		
PRIORITY APPLN. INFO.:			JP 2003-324100	A 20030917
<--				
			WO 2004-JP13687	W 20040917
<--				

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 01 Apr 2005

AB The electrolyte solution has an electrolyte salt dissolved in a nonaq. solvent; where the electrolyte solution further contains a pentafluorophenyloxy compound C6F5-OR1 (R1 = substituent selected from C2-12 alkyl carbonyl, C7-18 aryloxy carbonyl and/or C1-12 alkane sulfonyl group; and at least one H atom of the substituent may be substituted by a halogen atom or an C6-18 aryl group) and a vinylene carbonate and/or 1,3-propane sultone. The battery has a cathode, an anode, and the above electrolyte solution

IT 7782-42-5, Graphite, uses 12057-17-9, Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt lithium oxide (CoLiO2) (electrolyte solns. containing pentafluorophenyloxy compds. for secondary lithium batteries)

RN 7782-42-5 HCAPLUS

CN Graphite (CA INDEX NAME)

RN 12057-17-9 HCAPLUS

CN Lithium manganese oxide (LiMn2O4) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Mn	2	7439-96-5
Li	1	7439-93-2

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	1	7440-48-4
Li	1	7439-93-2

IT 872-36-6, Vinylene carbonate 1120-71-4,  
 1,3-Propane sultone 71573-77-8, Dipropargyl oxalate  
 (electrolyte solns. containing pentafluorophenylloxy compds.  
 for secondary lithium batteries)

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



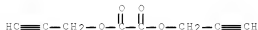
RN 1120-71-4 HCAPLUS

CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



RN 71573-77-8 HCAPLUS

CN Ethanedioic acid, 1,2-di-2-propyn-1-yl ester (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium battery electrolyte pentafluorophenylloxy

compd  
 IT Battery electrolytes  
   (electrolyte solns. containing pentafluorophenyloxy compds.  
   for secondary lithium batteries)  
 IT Secondary batteries  
   (lithium; electrolyte solns. containing pentafluorophenyloxy  
   compds. for secondary lithium batteries)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
   623-53-0, Methyl ethyl carbonate 7782-42-5,  
   Graphite, uses 12057-17-9, Lithium manganese oxide  
   (LiMn2O4) 12190-79-3, Cobalt lithium oxide (CoLiO2)  
   14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium  
   hexafluorophosphate  
   (electrolyte solns. containing pentafluorophenyloxy compds.  
   for secondary lithium batteries)  
 IT 96-48-0 827-52-1, Cyclohexyl benzene 872-36-6, Vinylene  
   carbonate 1120-71-4, 1,3-Propane sultone 1717-84-6  
   2049-95-8, tert-Pentyl benzene 5129-37-3, Butyl pivalate  
   19220-93-0, Pentafluorophenyl acetate 36919-03-6, Methyl  
   pentafluorophenyl carbonate 71573-77-8, Diisopargyl  
   oxalate 161912-36-3  
   (electrolyte solns. containing pentafluorophenyloxy compds.  
   for secondary lithium batteries)  
 OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS  
   RECORD (5 CITINGS)  
 REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR  
   THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
   RE FORMAT

L87 ANSWER 6 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2005:141448 HCAPLUS Full-text  
 DOCUMENT NUMBER: 142:243601  
 TITLE: Secondary lithium battery and its  
   nonaqueous electrolyte solution  
 INVENTOR(S): Abe, Koji; Miyoshi, Kazuhiro; Kuwata, Takaaki;  
   Matsumori, Yasuo  
 PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan  
 SOURCE: PCT Int. Appl., 36 pp.  
   CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005015677	A1	20050217	WO 2004-JP11714	20040809
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CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,				
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP,				
KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,				
MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,				
SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,				
VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,				
AM, AZ, BY, BG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,				
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,				
PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,				
GW, ML, MR, NE, SN, TD, TG				

CN 1836347 A 20060920 CN 2004-80022913 20040809  
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 CN 100431217 C 20081105  
 KR 2006060683 A 20060605 KR 2006-702791 20060209  
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 US 20060246356 A1 20061102 US 2006-567902 20060210  
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 PRIORITY APPLN. INFO.: JP 2003-291129 A 20030811  
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 JP 2003-383406 A 20031113  
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 WO 2004-JP11714 W 20040809  
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## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 18 Feb 2005

AB The battery comprised a cathode, an anode, and a nonaq. electrolyte solution having an electrolyte salt dissolved in a nonaq. solvent mixture; where the cathode is a Li composite oxide containing material, the anode is a graphite containing material; and the electrolyte solution contains a dialkyl oxalate and a vinylene carbonate and/or 1,3-propane sultone.

IT 7782-42-5, Graphite, uses 12057-17-9,  
 Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt  
 lithium oxide (CoLiO2)  
 (electrolyte solns. containing dialkyl oxalates and vinylene  
 carbonate and/or 1,3-propane sultone for secondary lithium  
 batteries)

RN 7782-42-5 HCAPLUS

CN Graphite (CA INDEX NAME)

c

RN 12057-17-9 HCAPLUS

CN Lithium manganese oxide (LiMn2O4) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Mn	2	7439-96-5
Li	1	7439-93-2

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	1	7440-48-4
Li	1	7439-93-2

IT 553-90-2, Dimethyl oxalate 615-52-1, Methyl  
 ethyl oxalate 872-36-6, Vinylene carbonate  
 1120-71-4, 1,3-Propane sultone 2050-60-4, Dibutyl  
 oxalate 5132-19-4 20602-87-3, Dihexyl oxalate  
 20760-45-6, Diocetyl oxalate 841302-60-1

841302-61-2 841302-62-3

(electrolyte solns. containing dialkyl oxalates and vinylene carbonate and/or 1,3-propane sultone for secondary lithium batteries)

RN 553-90-2 HCAPLUS

CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



RN 615-52-1 HCAPLUS

CN Ethanedioic acid, 1-ethyl 2-methyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 1120-71-4 HCAPLUS

CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



RN 2050-60-4 HCAPLUS

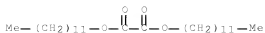
CN Ethanedioic acid, 1,2-dibutyl ester (CA INDEX NAME)



RN 5132-19-4 HCAPLUS

CN Ethanedioic acid, 1,2-didodecyl ester (CA INDEX NAME)





RN 20602-87-3 HCAPLUS

CN Ethanedioic acid, 1,2-dihexyl ester (CA INDEX NAME)



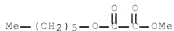
RN 20760-45-6 HCAPLUS

CN Ethanedioic acid, 1,2-dioctyl ester (CA INDEX NAME)



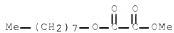
RN 841302-60-1 HCAPLUS

CN Ethanedioic acid, 1-hexyl 2-methyl ester (CA INDEX NAME)



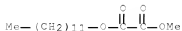
RN 841302-61-2 HCAPLUS

CN Ethanedioic acid, 1-methyl 2-octyl ester (CA INDEX NAME)



RN 841302-62-3 HCAPLUS

CN Ethanedioic acid, 1-dodecyl 2-methyl ester (CA INDEX NAME)



IC ICM H01M010-40

ICS H01M004-58; H01M004-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium battery electrolyte additive dialkyl oxalate vinylene carbonate; battery electrolyte additive propane sultone

IT Battery electrolytes  
(electrolyte solns. containing dialkyl oxalates and vinylene carbonate and/or 1,3-propane sultone for secondary lithium batteries)

IT Secondary batteries  
(lithium; electrolyte solns. containing dialkyl oxalates and vinylene carbonate and/or 1,3-propane sultone for secondary lithium batteries)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Methyl ethyl carbonate 7782-42-5, Graphite, uses 12057-17-9, Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt lithium oxide (CoLiO2) 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
(electrolyte solns. containing dialkyl oxalates and vinylene carbonate and/or 1,3-propane sultone for secondary lithium batteries)

IT 108-59-8, Dimethyl malonate 553-90-2, Dimethyl oxalate 615-52-1, Methyl ethyl oxalate 872-36-6, Vinylene carbonate 1120-71-4, 1,3-Propane sultone 2050-60-4, Dibutyl oxalate 5132-19-4 20602-87-3, Dihexyl oxalate 20760-45-6, Dioctyl oxalate 61764-71-4, Methyl propargyl carbonate 841302-60-1 841302-61-2 841302-62-3  
(electrolyte solns. containing dialkyl oxalates and vinylene carbonate and/or 1,3-propane sultone for secondary lithium batteries)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L87 ANSWER 7 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2005:76450 HCAPLUS Full-text

DOCUMENT NUMBER: 142:180441

TITLE: Nonaqueous electrolyte solution for secondary lithium battery and the battery

INVENTOR(S): Abe, Koji; Miyoshi, Kazuhiro; Kuwata, Takaaki

PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan

SOURCE: PCT Int. Appl., 48 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2005008829	A1	20050127	WO 2004-JP10194	20040716

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MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD,  
 SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
 VC, VN, YU, ZA, ZM, ZW  
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,  
 AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,  
 DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL,  
 PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
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CA 2532579	A1	20050127	CA 2004-2532579	20040716
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EP 1650826	A1	20060426	EP 2004-747660	20040716
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CN 1853307	A	20061025	CN 2004-80026556	20040716
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CN 100517853	C	20090722		
ZA 2006000431	A	20070425	ZA 2006-431	20060116
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IN 2006CN00200	A	20070629	IN 2006-CN200	20060116
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KR 2006035767	A	20060426	KR 2006-701080	20060117
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US 20060177742	A1	20060810	US 2006-564852	20060117
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IN 2007CN04612	A	20080328	IN 2007-CN4612	20071016
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PRIORITY APPLN. INFO.:			JP 2003-198421	A 20030717
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			JP 2003-383403	A 20031113
			<--	
			WO 2004-JP10194	W 20040716
			<--	
			IN 2006-CN200	A3 20060116
			<--	
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT				
OTHER SOURCE(S): MARPAT 142:180441				
ED Entered STN: 28 Jan 2005				
GI				

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The electrolyte solution contains 0.01-10% vinyl carbonate compound I (R1 and R2 = H or C1-4 alkyl groups) and 0.01-10% alkyne compds. selected from II-VII (R's and Y's defined; and x and p = 1 or 2).

IT 872-36-6, Vinylene carbonate 1120-71-4,  
 1,3-Propanesultone 71573-77-8, Di(2-propynyl) oxalate  
 131166-79-5  
 (electrolyte solns. containing vinyl carbonate derivs. and  
 alkyne compds. for secondary lithium batteries)

RN 872-36-6 HCAPLUS

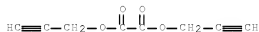
CN 1,3-Dioxol-2-one (CA INDEX NAME)



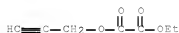
RN 1120-71-4 HCAPLUS  
 CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



RN 71573-77-8 HCAPLUS  
 CN Ethanedioic acid, 1,2-di-2-propyn-1-yl ester (CA INDEX NAME)



RN 131166-79-5 HCAPLUS  
 CN Ethanedioic acid, 1-ethyl 2-(2-propyn-1-yl) ester (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-02; H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery electrolyte soln vinyl carbonate  
 deriv; acetylene group compd secondary lithium battery  
 electrolyte soln  
 IT Battery electrolytes  
 (electrolyte solns. containing vinyl carbonate derivs. and  
 alkyne compds. for secondary lithium batteries)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 623-53-0, Ethyl methyl carbonate 21324-40-3, Lithium  
 hexafluorophosphate 90076-65-6  
 (electrolyte solns. containing vinyl carbonate derivs. and  
 alkyne compds. for secondary lithium batteries)  
 IT 98-06-6, tert-Butylbenzene 452-10-8, 2,4-Difluoroanisole 462-06-6,  
 Fluorobenzene 536-74-3, Phenylacetylene 827-52-1,  
 Cyclohexylbenzene 872-36-6, Vinylene carbonate  
 1072-53-3, Ethylene sulfate 1120-71-4, 1,3-Propanesultone  
 1717-84-6 2049-95-8, tert-Amylbenzene 16156-58-4, 2-Propynyl  
 methanesulfonate 32042-39-0 36677-73-3 61764-71-4  
 71573-77-8, Di(2-propynyl) oxalate 79493-91-7, Dipropargyl  
 carbonate 131166-79-5 197244-15-8 347396-84-3

406725-07-3 833427-83-1

(electrolyte solns. containing vinyl carbonate derivs. and  
alkyne compds. for secondary lithium batteries)REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
RE FORMAT

L87 ANSWER 8 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2002:962382 HCAPLUS Full-text

DOCUMENT NUMBER: 138:58890

TITLE: Electrolyte and secondary battery

INVENTOR(S): Shizuka, Kenji; Okahara, Kenji; Shima, Kunihi

PATENT ASSIGNEE(S): Mitsubishi Chemical Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002367674	A	20021220	JP 2001-175182	20010611
			<--	
PRIORITY APPLN. INFO.:			JP 2001-175182	20010611
			<--	

OTHER SOURCE(S): MARPAT 138:58890

ED Entered STN: 20 Dec 2002

AB The electrolyte solution has a Li salt dissolved in a solvent mixture containing  $\geq 1$  nonaq. solvent selected from carbonate esters, ethers and/or lactones; a dicarboxylate diester of the formula  $R1O2(CH2)nO2R2$  or  $R3O2(CH2)pCH:CH(CH2)qO2R4$  (excluding succinate diesters) [ $R1-R4 = C1-10$  alkyl or halogen substituted alkyl;  $n =$  an integer from 0-1 and 3-10;  $p$  and  $q =$  an integer from 0-5; and  $0 \leq (p+q) \leq 10$ ], or a derivative thereof; and an aromatic compound of the formula  $C6R1R2R3R4R5R6$  or  $R1OC6R2R3R4R5R6$  [ $R1-R6 = H$ , halogen,  $C1-10$  chain alkyl,  $C4-10$  cyclic alkyl, or (substituted) phenyl], having mol. weight  $\leq 500$ . The battery has the above electrolyte solution, a cathode containing a Li transition metal oxide, and a carbonaceous anode.

IT 95-92-1, Diethyl oxalate  
(electrolyte solns. containing dicarboxylate diesters and  
aromatic compds. with controlled mol. weight for secondary lithium  
batteries)

RN 95-92-1 HCAPLUS

CN Ethanedioic acid, 1,2-diethyl ester (CA INDEX NAME)



IC ICM H01M010-40

ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery electrolyte nonaq solvent additive

dicarboxylate diester

IT Battery electrolytes

(electrolyte solns. containing dicarboxylate diesters and

aromatic compds. with controlled mol. weight for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
21324-40-3, Lithium hexafluorophosphate  
(electrolyte solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

IT 95-92-1, Diethyl oxalate 108-59-8, Dimethyl malonate  
132-64-9, Dibenzofuran 872-36-6, Vinylene carbonate  
(electrolyte solns. containing dicarboxylate diesters and aromatic compds. with controlled mol. weight for secondary lithium batteries)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L87 ANSWER 9 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
ACCESSION NUMBER: 2002:313468 HCAPLUS Full-text  
DOCUMENT NUMBER: 136:343311  
TITLE: Nonaqueous electrolyte solution and secondary lithium battery using the electrolyte solution  
INVENTOR(S): Hamamoto, Shunichi; Abe, Hiroshi; Yuguchi, Motoshi; Ushikoshi, Yoshihiro; Matsumori, Yasuo  
PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002124297	A	20020426	JP 2000-313549	20001013
JP 3823712	B2	20060920	<--	
PRIORITY APPLN. INFO.:			JP 2000-313549	20001013
			<--	

OTHER SOURCE(S): MARPAT 136:343311

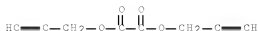
ED Entered STN: 26 Apr 2002

AB The electrolyte solution contains  $\geq 1$  alkynyl compound  $R1C.tplbond.C(CR2R3)nOXY$ , where  $X = -SO-$ ,  $-SO_2-$ , or  $-COCO-$ ;  $Y = C1-12$  alkyl, alkenyl, alkynyl group,  $C3-6$  cycloalkyl group,  $C6-12$  aryl group, or  $C7-12$  aralkyl group;  $R1-3 = C1-12$  alkyl, alkenyl, alkynyl group,  $C3-6$  cycloalkyl group,  $C6-12$  aryl group, or  $C7-12$  aralkyl group,  $R2$  and  $R3$  may join together forming a  $C3-6$  cycloalkyl group, and  $n = 1$  or  $2$ .

IT 71573-77-8, Di-(2-propynyl) oxalate 417706-30-0  
(nonsq. electrolyte solns. containing alkynyl compds. for secondary lithium batteries)

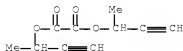
RN 71573-77-8 HCAPLUS

CN Ethanedioic acid, 1,2-di-2-propyn-1-yl ester (CA INDEX NAME)



RN 417706-30-0 HCAPLUS

CN Ethanedioic acid, 1,2-bis(1-methyl-2-propyn-1-yl) ester (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery electrolyte alkynyl compd  
 IT Battery electrolytes  
     (nonaq. electrolyte solns. containing alkynyl  
     compds. for secondary lithium batteries)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,  
     Propylene carbonate 616-38-6, Dimethyl carbonate 21324-40-3,  
     Lithium hexafluorophosphate  
     (nonaq. electrolyte solns. containing alkynyl  
     compds. for secondary lithium batteries)  
 IT 1899-25-8 19828-82-1 71573-77-8, Di-(2-propynyl) oxalate  
     417706-29-7 417706-30-0  
     (nonaq. electrolyte solns. containing alkynyl  
     compds. for secondary lithium batteries)  
 OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS  
     RECORD (4 CITINGS)

L87 ANSWER 10 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 1998:464361 HCAPLUS Full-text  
 DOCUMENT NUMBER: 129:109417  
 ORIGINAL REFERENCE NO.: 129:22483a,22486a  
 TITLE: Salts of malononitrile-based anions for use as  
     ionic conductors  
 INVENTOR(S): Armand, Michel; Choquette, Yves; Gauthier, Michel;  
     Michot, Christophe  
 PATENT ASSIGNEE(S): Centre National de la Recherche Scientifique  
     (CNRS), Fr.; Hydro-Quebec  
 SOURCE: Eur. Pat. Appl., 49 pp.  
     CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: French  
 FAMILY ACC. NUM. COUNT: 5  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 850921	A1	19980701	EP 1997-403189	19971230
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EP 850921	B1	20020925		
			R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO	
CA 2194127	A1	19980630	CA 1996-2194127	19961230
			<--	
CA 2199231	A1	19980905	CA 1997-2199231	19970305
			<--	
CA 2244979	A1	19980709	CA 1997-2244979	19971230
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## 10/567,902

CA 2244979	C	20080506		
CA 2248242	A1	19980709	CA 1997-2248242	19971230
			<--	
CA 2248244	A1	19980709	CA 1997-2248244	19971230
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CA 2248246	A1	19980709	CA 1997-2248246	19971230
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CA 2248246	C	20100209		
CA 2248303	A1	19980709	CA 1997-2248303	19971230
			<--	
CA 2248304	A1	19980709	CA 1997-2248304	19971230
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CA 2248304	C	20071113		
CA 2683826	A1	19980709	CA 1997-2683826	19971230
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WO 9829358	A2	19980709	WO 1997-CA1008	19971230
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WO 9829358	A3	19981008		
W: CA, JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,				
PT, SE				
WO 9829399	A1	19980709	WO 1997-CA1009	19971230
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W: CA, JP, US				
WO 9829389	A1	19980709	WO 1997-CA1010	19971230
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W: CA, JP, US				
WO 9829396	A1	19980709	WO 1997-CA1011	19971230
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W: CA, JP, US				
WO 9829877	A1	19980709	WO 1997-CA1012	19971230
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W: CA, JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,				
PT, SE				
WO 9829388	A1	19980709	WO 1997-CA1013	19971230
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W: CA, JP, US				
EP 889863	A2	19990113	EP 1997-951051	19971230
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EP 889863	B1	20030507		
R: DE, FR, GB, IT				
EP 890176	A1	19990113	EP 1997-951052	19971230
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EP 890176	B1	20010620		
R: DE, FR, GB, IT				
JP 2000508114	T	20000627	JP 1998-529517	19971230
			<--	
JP 4361137	B2	20091111		
JP 2000508346	T	20000704	JP 1998-529516	19971230
			<--	
JP 2000508676	T	20000711	JP 1998-529514	19971230
			<--	
JP 4124487	B2	20080723		
JP 2000508677	T	20000711	JP 1998-529515	19971230
			<--	
JP 2000508678	T	20000711	JP 1998-529518	19971230
			<--	
EP 1201650	A2	20020502	EP 2001-129670	19971230
			<--	



## 10/567,902

EP 1201650	A3	20040102		
EP 1201650	B1	20061122		
R: DE, FR, GB, IT				
JP 2002514245	T	20020514	JP 1998-529513	19971230
			<--	
JP 4070244	B2	20080402		
US 6120696	A	20000919	US 1998-125792	19980828
			<--	
US 6171522	B1	20010109	US 1998-101811	19981119
			<--	
US 6333425	B1	20011225	US 1998-101810	19981119
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US 6228942	B1	20010508	US 1998-125798	19981202
			<--	
US 6395367	B1	20020528	US 1998-125799	19981202
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US 6319428	B1	20011120	US 1998-125797	19981203
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US 6365068	B1	20020402	US 2000-609362	20000630
			<--	
US 6576159	B1	20030610	US 2000-638793	20000809
			<--	
US 20010024749	A1	20010927	US 2001-826941	20010406
			<--	
US 6506517	B2	20030114		
US 20020009650	A1	20020124	US 2001-858439	20010516
			<--	
US 20020102380	A1	20020801	US 2002-107742	20020327
			<--	
US 6835495	B2	20041228		
US 20030052310	A1	20030320	US 2002-253035	20020924
			<--	
US 20030066988	A1	20030410	US 2002-253970	20020924
			<--	
US 20050074668	A1	20050407	US 2004-789453	20040227
			<--	
US 20050123831	A1	20050609	US 2004-926283	20040825
			<--	
JP 2008007781	A	20080117	JP 2007-193021	20070725
			<--	
JP 2009004374	A	20090108	JP 2008-143090	20080530
			<--	
JP 2009149656	A	20090709	JP 2009-10733	20090121
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JP 2009242401	A	20091022	JP 2009-120239	20090518
			<--	
PRIORITY APPLN. INFO.:			CA 1996-2194127	A 19961230
			<--	
			CA 1997-2199231	A 19970305
			<--	
			CA 1997-2248246	A3 19971230
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			EP 1997-403189	A3 19971230
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			JP 1998-529513	A3 19971230
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			JP 1998-529516	A3 19971230
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			JP 1998-529517	A3 19971230
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JP 1998-529518	A3 19971230
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WO 1997-CA1008	W 19971230
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WO 1997-CA1009	W 19971230
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WO 1997-CA1010	W 19971230
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WO 1997-CA1011	W 19971230
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WO 1997-CA1012	W 19971230
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WO 1997-CA1013	W 19971230
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US 1998-101810	A3 19981119
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US 1998-101811	A3 19981119
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US 1998-125798	A3 19981202
<--	
US 1998-125799	A3 19981202
<--	
US 1998-125797	A1 19981203
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US 2000-638793	A1 20000809
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US 2001-858439	A1 20010516
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US 2002-107742	A1 20020327
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## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

OTHER SOURCE(S): MARPAT 129:109417

ED Entered STN: 27 Jul 1998

AB The title compds., of specified structure and also useful as polymerization catalysts, colorants, etc., are prepared Stirring 10 mmol each stearoyl chloride and malononitrile K salt in THF at room temperature for 24 h, filtering, and stirring the filtrate with 500 mg Li<sub>2</sub>CO<sub>3</sub> for 24 h gave >97% C17H35COC(CN)<sub>2</sub>- Li<sup>+</sup>. Use of the products in the above applications is exemplified.

IT 1120-71-4, 1,3-Propanesultone  
(reaction with lithiated phenazine and malononitrile K salt)

RN 1120-71-4 HCAPLUS

CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



IT 553-90-2, Dimethyl oxalate  
(reaction with malononitrile K salt)

RN 553-90-2 HCAPLUS

CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



IC ICM C07C317-44  
 ICS C07C255-17; C07C255-65; C07C255-27; C07C255-05; C07C255-35;  
 C08F220-44; C07C255-31; C08G065-48; C08G073-06; C08G077-44;  
 C08G073-02; C07F017-02; C07F007-18; C07C311-02; C09K003-00;  
 H01M006-16; H01M010-40; C07B041-00; C08F004-00  
 CC 35-3 (Chemistry of Synthetic High Polymers)  
 Section cross-reference(s): 23, 40, 67  
 IT Battery electrolytes  
 (malononitrile derivative salts as battery electrolytes)  
 IT Acid-base indicators  
 (malononitrile derivative salts as pH indicators in nonaq.  
 solvents)  
 IT Polyelectrolytes  
 (malononitrile derivative salts as polymeric electrolytes)  
 IT 1120-71-4, 1,3-Propanesultone  
 (reaction with lithiated phenazine and malononitrile K salt)  
 IT 67-42-5 81-88-9, Rhodamine B 112-76-5, Stearoyl chloride  
 401-99-0, 1,3-Dinitro-5-(trifluoromethyl)benzene 553-90-2,  
 Dimethyl oxalate 700-16-3, Pentafluoropyridine 38870-89-2,  
 Methoxyacetyl chloride 40724-67-2 53188-07-1, Trolox 56512-49-3  
 86688-96-2, 1H-Pyrrole-3-acetic acid 210043-94-0  
 (reaction with malononitrile K salt)  
 OS.CITING REF COUNT: 9 THERE ARE 9 CAPLUS RECORDS THAT CITE THIS  
 RECORD (9 CITINGS)  
 REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
 RE FORMAT

L87 ANSWER 11 OF 14 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 1997:505252 HCAPLUS Full-text  
 DOCUMENT NUMBER: 127:193073  
 ORIGINAL REFERENCE NO.: 127:37405a,37408a  
 TITLE: Secondary nonaqueous electrolyte  
 batteries with oxalate ester containing  
 electrolyte solvents  
 INVENTOR(S): Yamahira, Takayuki  
 PATENT ASSIGNEE(S): Sony Corp., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09199172	A	19970731	JP 1996-26160	19960118
			<--	
PRIORITY APPLN. INFO.:			JP 1996-26160	19960118
			<--	

ED Entered STN: 09 Aug 1997  
 AB The batteries use Li containing oxide cathodes, Li intercalating carbonaceous anode, and a Li salt electrolyte dissolved in a nonaq. solvent; where the solvent contains diesters of oxalic acid. The esters are selected from di-Me

oxalate, di-ET oxalate, di-Pr oxalate, di-iso-Pr oxalate, Et Me oxalate, Me Pr oxalate, and Et Pr oxalate. These batteries have high voltage and good cycling performance at heavy loads.

- IT 95-92-1, Diethyl oxalate 553-90-2, Dimethyl oxalate 615-52-1 615-81-6, Di-iso-propyl oxalate 615-98-5, Dipropyl oxalate 26404-21-7, Methyl propyl oxalate 26404-25-1, Ethyl propyl oxalate (solvent mixts. containing diesters of oxalic acid for lithium hexafluorophosphate in secondary lithium batteries)
- RN 95-92-1 HCAPLUS
- CN Ethanedioic acid, 1,2-diethyl ester (CA INDEX NAME)



- RN 553-90-2 HCAPLUS
- CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



- RN 615-52-1 HCAPLUS
- CN Ethanedioic acid, 1-ethyl 2-methyl ester (CA INDEX NAME)



- RN 615-81-6 HCAPLUS
- CN Ethanedioic acid, 1,2-bis(1-methylethyl) ester (CA INDEX NAME)



- RN 615-98-5 HCAPLUS
- CN Ethanedioic acid, 1,2-dipropyl ester (CA INDEX NAME)



RN 26404-21-7 HCAPLUS  
 CN Ethanedioic acid, 1-methyl 2-propyl ester (CA INDEX NAME)



RN 26404-25-1 HCAPLUS  
 CN Ethanedioic acid, 1-ethyl 2-propyl ester (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery electrolyte oxalic acid diester  
 IT Battery electrolytes  
     (solvent mixts. containing diesters of oxalic acid for lithium  
     hexafluorophosphate in secondary lithium batteries)  
 IT 95-92-1, Diethyl oxalate 96-49-1, Ethylene carbonate  
 108-32-7, Propylene carbonate 553-90-2, Dimethyl oxalate  
 615-52-1 615-81-6, Di-iso-propyl oxalate  
 615-98-5, Dipropyl oxalate 21324-40-3, Lithium  
 hexafluorophosphate 26404-21-7, Methyl propyl oxalate  
 26404-25-1, Ethyl propyl oxalate  
     (solvent mixts. containing diesters of oxalic acid for lithium  
     hexafluorophosphate in secondary lithium batteries)  
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS  
 RECORD (1 CITINGS)

L87 ANSWER 12 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 1997:101100 HCAPLUS Full-text  
 DOCUMENT NUMBER: 126:106586  
 ORIGINAL REFERENCE NO.: 126:20539a,20542a  
 TITLE: Nonaqueous electrolyte  
         batteries having reactive additives in  
         electrolytes  
 INVENTOR(S): Jinno, Maruo; Uehara, Mayumi; Sakurai, Atsushi;  
               Nishio, Koji; Saito, Toshihiko  
 PATENT ASSIGNEE(S): Sanyo Denki Kk, Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.  
           CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08321311	A	19961203	JP 1995-150843	19950524
			<--	
PRIORITY APPLN. INFO.:			JP 1995-150843	19950524

ED Entered STN: 12 Feb 1997

AB In the batteries having cathodes, anodes using Li as an active mass, nonaq. electrolytes obtained by dissolving LiCF<sub>3</sub>SO<sub>3</sub> or LiPF<sub>6</sub> in solvents of ethylene carbonate, propylene carbonate, and/or butylene carbonate having high dielec. constant, and separators, the electrolytes contain 1-20 volume% additives of acetone, MeOH, EtOH, 1-propanol, ethylene glycol, 1,2-propanediol, HAC, propionaldehyde, butylaldehyde, Et Me ketone, 2-pentanone, cyclohexanone, Me formate, Et formate, Pr formate, Me acetate, Et acetate, di-Me oxalate, di-Et oxalate, formic acid, AcOH, propionic acid, acetic anhydride, dimethylethoxysilane, dimethoxydimethylsilane, methyltrimethoxysilane, and/or tetramethoxysilane. The electrolytes may contain 1,2-dimethoxyethane. Since the additives react with Li in anodes and the solvents and the solutes in the electrolytes to form coatings on the anodes for prevention of the reaction between the electrolytes and the anodes, the batteries have improved storage property.

IT 95-92-1, Diethyl oxalate 553-90-2, Dimethyl oxalate  
(electrolyte additive; nonaq. batteries having reactive additives in electrolytes for storage)

RN 95-92-1 HCAPLUS

CN Ethanedioic acid, 1,2-diethyl ester (CA INDEX NAME)



RN 553-90-2 HCAPLUS

CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



IC ICM H01M006-16  
ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq battery electrolyte reactive additive storage; lithium anode nonaq battery electrolyte additive

IT Battery electrolytes  
(nonaq. batteries having reactive additives in electrolytes for storage)

IT 7439-93-2, Lithium, uses  
(anode active mass; nonaq. batteries having reactive additives in electrolytes for storage)

IT 57-55-6, 1,2-Propanediol, uses 64-17-5, Ethanol, uses 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 67-56-1, Methanol, uses 67-64-1, Acetone, uses 71-23-8, 1-Propanol, uses 75-07-0, Acetaldehyde, uses 78-93-3, Ethyl methyl ketone, uses 79-09-4, Propionic acid, uses 79-20-9, Methyl acetate 95-92-1, Diethyl oxalate 107-21-1, Ethylene glycol, uses 107-31-3, Methyl formate 107-87-9, 2-Pentanone 108-24-7, Acetic anhydride 108-94-1, Cyclohexanone, uses 109-94-4, Ethyl formate 110-74-7,

Propyl formate 123-38-6, Propionaldehyde, uses 123-72-8,  
 Butylaldehyde 141-78-6, Ethyl acetate, uses 553-90-2,  
 Dimethyl oxalate 681-84-5, Tetramethoxysilane 1112-39-6,  
 Dimethoxydimethylsilane 1185-55-3, Methyltrimethoxysilane  
 14857-34-2, Dimethylethoxysilane  
 (electrolyte additive; nonaq. batteries having  
 reactive additives in electrolytes for storage)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 110-71-4, 1,2-Dimethoxyethane 4437-85-8, Butylene carbonate  
 (electrolyte solvent; nonaq. batteries having  
 reactive additives in electrolytes for storage)  
 IT 21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium  
 trifluoromethanesulfonate  
 (electrolyte; nonaq. batteries having reactive  
 additives in electrolytes for storage)  
 OS.CITING REF COUNT: 5 THERE ARE 5 CAPLUS RECORDS THAT CITE THIS  
 RECORD (5 CITINGS)

L87 ANSWER 13 OF 14 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 1996:387903 HCAPLUS Full-text  
 DOCUMENT NUMBER: 125:38110  
 ORIGINAL REFERENCE NO.: 125:7305a,7308a  
 TITLE: Secondary nonaqueous electrolyte  
 batteries with improved electrolyte  
 solvents  
 INVENTOR(S): Matsui, Tooru; Takeyama, Kenichi  
 PATENT ASSIGNEE(S): Matsushita Electric Ind Co Ltd, Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08096849	A	19960412	JP 1994-228378	19940922
			<--	
PRIORITY APPLN. INFO.:			JP 1994-228378	19940922
			<--	

ED Entered STN: 04 Jul 1996  
 AB Secondary alkali metal batteries use nonaq. electrolyte solvent mixts.  
 containing esters of saturated dicarboxylic acid (CmH2m+1) OCO(CH2)lCO2CnH2n+1  
 (l ≥ 0; m ≥ 0; n ≥ 0). The main solvent component is selected from ethylene  
 carbonate, propylene carbonate, and (EtO)2CO.  
 IT 553-90-2, Dimethyl oxalate  
 (electrolyte solvent mixts. containing saturated dicarboxylate  
 esters for secondary Li battery)  
 RN 553-90-2 HCAPLUS  
 CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery electrolyte solvent dicarboxylate ester  
 IT Battery electrolytes  
 (electrolyte solvent mixts. containing saturated dicarboxylate  
 esters for secondary Li battery)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 105-99-7,  
 Dibutyl adipate 106-19-4, Dipropyl adipate 106-65-0, Dimethyl  
 succinate 106-79-6, Dimethyl sebacate 108-32-7, Propylene  
 carbonate 108-59-8, Dimethyl malonate 141-28-6, Diethyl adipate  
 553-90-2, Dimethyl oxalate 627-93-0, Dimethyl adipate  
 1119-40-0, Dimethyl glutarate 1732-08-7, Dimethyl pimelate  
 1732-09-8, Dimethyl suberate 1732-10-1, Dimethyl azelate  
 14027-78-2, Dipentyl adipate  
 (electrolyte solvent mixts. containing saturated dicarboxylate  
 esters for secondary Li battery)  
 OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS  
 RECORD (3 CITINGS)

L87 ANSWER 14 OF 14 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 1985:69341 HCAPLUS Full-text  
 DOCUMENT NUMBER: 102:69341  
 ORIGINAL REFERENCE NO.: 102:10781a  
 TITLE: Electrochemical dicarboxylation of unsaturated  
 organic compounds  
 INVENTOR(S): Tkatchenko, Igor Boris Michel;  
 Ballivet-Tkatchenko, Danielle A.; Murr, Nabil El;  
 Tanji, Jamal; Payne, John David  
 PATENT ASSIGNEE(S): Societe Nationale des Poudres et Explosifs, Fr.  
 SOURCE: Fr. Demande, 14 pp.  
 CODEN: FRXXBL  
 DOCUMENT TYPE: Patent  
 LANGUAGE: French  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2542764	A1	19840921	FR 1983-4355	19830317
			<--	
FR 2542764	B1	19850621		
PRIORITY APPLN. INFO.:			FR 1983-4355	19830317
			<--	

ED Entered STN: 24 Feb 1985

AB A procedure is described for preparing dicarboxylic acids or their derivs. directly from unsatd. organic compds. The latter are electrochem. reduced in a cell in the presence of CO<sub>2</sub>, a catalyst comprising a transition metal carbonyl complex, and a supporting electrolyte and/or a nonsq. solvent usable in the electrochem. of unsatd. compds. and an electrolyte at a slightly electroneg. potential, lower than the electroredn. potential of CO<sub>2</sub> and of the unsatd. compound at 0-50 bars pressure and a temperature of -20 to 60°. Then the reaction is conducted in a known manner of the dicarboxylate anion formed to obtain the acids or their derivs. The obtained compds. are intermediates in very interesting syntheses, e.g. of polymers. An example is given of the preparation of the methyl-3-hexene-1,6-dicarboxylate [41820-27-3] from butadiene. Into an electrochem. cell, under Ar, one places successively Hg, a bar magnet, the complex di-Fe dicyclopentadienyl tetracarbonyl (50 mg, 0.15 +10-3 mol) and then the solvent THF (80 mL) containing the electrolyte Bu<sub>4</sub>NPF<sub>6</sub> (15 g, 0.038 mol). To the solution is added butadiene (6 g, 0.11 mol) dissolved in 20 mL of THF at 0°. The solution is then placed in the anodic compartment. After closing the reactor, CO<sub>2</sub> is introduced to obtain and maintain a pressure of 3 bars at room temperature in the reactor during the



electrolysis which consumes CO<sub>2</sub>. The electrolysis is stopped after .apprx.10 h (3560 coulombs were consumed). After degassing the cell, the reaction mixture is distilled under static vacuum (10-1 torr) at ambient temperature to remove the solvent and excess reactants. The current efficiency is 76%.

IT 553-90-2

(electrochem.preparation of, from ethylene in presence of carbon dioxide)

RN 553-90-2 HCAPLUS

CN Ethanedioic acid, 1,2-dimethyl ester (CA INDEX NAME)



IC C25B003-04; B01J031-20; C07C069-34; C07C069-593; C07C069-612

CC 72-4 (Electrochemistry)

Section cross-reference(s): 23

IT 553-90-2

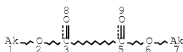
(electrochem.preparation of, from ethylene in presence of carbon dioxide)

OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD (4 CITINGS)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=&gt; d que 188

L4 12592 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON ?OXALAT?/CNS  
 L16 STR



## NODE ATTRIBUTES:

CONNECT IS E1 RC AT 1  
 CONNECT IS E1 RC AT 7  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 8

## STEREO ATTRIBUTES: NONE

L18 593 SEA FILE=REGISTRY SSS FUL L16  
 L20 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "1,3-PROPANE  
 SULTONE"/CN  
 L21 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "VINYLENE  
 CARBONATE"/CN  
 L22 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL ETHYL  
 OXALATE"/CN  
 L23 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL PROPYL  
 OXALATE"/CN  
 L25 7 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND C7H12O4/M  
 F  
 L26 6 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L25 AND METHYL?  
 L27 43 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND HEXYL?  
 L28 11 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND METHYL?  
 L29 0 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND 1-METHYL?  
 L30 5 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L27 AND 2-METHYL?  
 L31 15 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND HEPTYL?  
 L32 13 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND OCTYL?  
 L33 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND NONYL?  
 L34 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND DECYL?  
 L35 8 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND UNDECYL?  
 L36 11 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L18 AND DODECYL?  
 L37 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL ETHYL  
 CARBONATE"/CN  
 L38 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "PROPYLENE  
 CARBONATE"/CN  
 L39 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "DIMETHYL  
 CARBONATE"/CN  
 L40 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "ETHYLENE  
 CARBONATE"/CN  
 L41 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "METHYL ETHYL  
 CARBONATE"/CN

L42 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "ETHYLENE  
 CARBONATE"/CN  
 L43 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON BUTYROLACTONE/CN  
 L44 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON COLIO2/MF  
 L45 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON LIMN2O4/MF  
 L46 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON LINO2/MF  
 L47 462 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON (LI(L)CO(L)NI(L)O  
 )/ELS(L)4/ELC.SUB  
 L49 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON GRAPHITE/CN  
 L50 231065 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L49 OR GRAPHITE#  
 L51 1607 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L21  
 L52 2339 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L20  
 L53 42946 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON (L37 OR L38 OR  
 L39 OR L40 OR L41 OR L42 OR L43 OR L44 OR L45 OR L46)  
 L55 6008 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L18  
 L56 QUE SPE=ON ABB=ON PLU=ON ELECTROLYTE#  
 L57 QUE SPE=ON ABB=ON PLU=ON NONAQUEOUS? OR NON AQUEOUS?  
 L58 QUE SPE=ON ABB=ON PLU=ON L22 OR L23 OR (L26 OR L27 OR  
 L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR  
 L36)  
 L59 3 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57 AND  
 L58  
 L60 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57 AND  
 L55  
 L61 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L59 OR L60  
 L62 6 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L61 AND L52  
 L63 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L62 AND L51  
 L64 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON (L59 OR L60 OR  
 L61 OR L62 OR L63)  
 L65 QUE SPE=ON ABB=ON PLU=ON (L44 OR L45 OR L46 OR L47)  
 L66 3 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 AND L65  
 L67 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 AND L50  
 L68 QUE SPE=ON ABB=ON PLU=ON ANODE# OR NEGATIVE ELECTRODE  
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 L69 QUE SPE=ON ABB=ON PLU=ON CATHODE# OR POSITIVE ELECTRO  
 DE#  
 L70 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 OR L66 OR L67  
 L71 7 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 AND (L68 OR  
 L69)  
 L72 14 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 OR L71  
 L73 15561 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57  
 L74 164 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L73 AND OXALAT?  
 L75 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L74 AND L51  
 L76 10 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L75 AND L52  
 L77 15 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L75 AND L50  
 L78 12 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L77 AND L68 AND  
 L69  
 L79 13 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L74 AND L52  
 L80 26 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON (L76 OR L77 OR  
 L78 OR L79)  
 L81 20 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L80 NOT L72  
 L82 84095 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L4  
 L83 19 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L82 AND L81  
 L84 0 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L81 AND L66  
 L85 17 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L81 AND L53  
 L86 20 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L81 OR L83 OR L84  
 OR L85  
 L88 8 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L86 AND (1840-2006

)/PRY,AY,PY

=&gt; d 188 1-8 ibib ed abs hitstr hitind

L88 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2008:419488 HCAPLUS Full-text  
 DOCUMENT NUMBER: 148:430036  
 TITLE: Nonaqueous electrolyte  
 secondary battery  
 INVENTOR(S): Kitao, Hideki; Chiga, Takanobu  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 10pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
US 20080081262	A1	20080403	US 2007-866774	20071003
			<--	
US 7635542	B2	20091222		
JP 2008091236	A	20080417	JP 2006-271573	20061003
			<--	
PRIORITY APPLN. INFO.:			JP 2006-271573	A 20061003
			<--	

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 04 Apr 2008

AB A non-aqueous electrolyte secondary battery includes a pos. electrode, a neg. electrode, and a non-aqueous electrolyte comprising an electrolyte dissolved in a non-aqueous solvent. The neg. electrode uses a low crystalline carbon coated graphite in which at least part of the surface of graphite is coated with a low crystalline carbon material having lower crystallinity than that of graphite as a neg. electrode active material, and the non-aqueous electrolyte comprises a lithium salt which has oxalate complex as an anion, in addition to a mixed solvent of propylene carbonate and chain carbonate as a non-aqueous solvent.

IT 7782-42-5, Graphite, uses  
 (carbon-coated; nonaq. electrolyte secondary  
 battery)

RN 7782-42-5 HCAPLUS

CN Graphite (CA INDEX NAME)

c

IT 872-36-6, Vinylene carbonate  
 (nonaq. electrolyte secondary battery)

RN 872-36-6 HCAPLUS

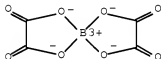
CN 1,3-Dioxol-2-one (CA INDEX NAME)



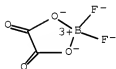
IT 108-32-7, Propylene carbonate 244761-29-3,  
 Lithium bisoxalatoborate 409071-16-5  
 (nonaq. electrolyte secondary battery)  
 RN 108-32-7 HCAPLUS  
 CN 1,3-Dioxolan-2-one, 4-methyl- (CA INDEX NAME)



RN 244761-29-3 HCAPLUS  
 CN Borate(1-), bis[ethanedioato(2-)-κO1,κO2]-, lithium (1:1),  
 (T-4)- (CA INDEX NAME)



RN 409071-16-5 HCAPLUS  
 CN Borate(1-), [ethanedioato(2-)-κO1,κO2]difluoro-, lithium  
 (1:1), (T-4)- (CA INDEX NAME)



INCL 429332000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte secondary battery  
 IT Secondary batteries  
 (nonaq. electrolyte secondary battery)  
 IT 7782-42-5, Graphite, uses  
 (carbon-coated; nonaq. electrolyte secondary  
 battery)  
 IT 7440-44-0, Carbon, uses

(graphite coated with; nonaq.  
electrolyte secondary battery)

IT 872-36-6, Vinylene carbonate 4427-96-7, Vinyl ethylene  
carbonate  
(nonaq. electrolyte secondary battery)

IT 108-32-7, Propylene carbonate 7439-93-2D, Lithium, salt  
7439-93-2D, Lithium, transition metal composite oxide 21324-40-3,  
Lithium hexafluorophosphate 39300-70-4, Lithium nickel oxide  
39457-42-6, Lithium manganese oxide 52627-24-4, Cobalt lithium oxide  
244761-29-3, Lithium bisoxalatoborate 409071-16-5  
521065-36-1 910558-11-1  
(nonaq. electrolyte secondary battery)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
RE FORMAT

L88 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2008:41823 HCAPLUS Full-text

DOCUMENT NUMBER: 148:124996

TITLE: Nonaqueous electrolyte  
compositions for secondary lithium ion batteries,  
and the batteries

INVENTOR(S): Kawashima, Atsumichi

PATENT ASSIGNEE(S): Sony Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 31pp.  
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2008004503	A	20080110	JP 2006-175666	20060626
			<--	
PRIORITY APPLN. INFO.:			JP 2006-175666	20060626
			<--	

ED Entered STN: 10 Jan 2008

AB Title comps. contain sulfone derivs., and oxalato complex salts containing B,  
Al, Ga, P, or Sb as central ions/atoms in addition to nonaq. solvents and  
electrolyte salts. The batteries do not show expansive deformation in high  
temperature environment, especially, packaged in laminated films.

IT 1120-71-4, Propanesultone 244761-29-3, Lithium  
bis(oxalato)borate 321201-33-6  
(nonaq. electrolytes containing oxalato  
complex salts and sulfones for secondary lithium ion batteries)

RN 1120-71-4 HCAPLUS

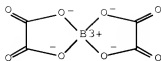
CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



RN 244761-29-3 HCAPLUS

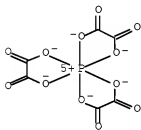
CN Borate(1-), bis[ethanedioato(2-)-κO1,κO2]-, lithium (1:1),

(T-4)- (CA INDEX NAME)

● Li<sup>+</sup>

RN 321201-33-6 HCAPLUS

CN Phosphate(1-), tris[ethanedioato(2-)-κO1,κO2]-, lithium  
(1:1), (OC-6-11)- (CA INDEX NAME)

● Li<sup>+</sup>

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery electrolyte oxalato complex salt;  
 oxalato complex phosphate borate lithium battery  
 electrolyte; aluminum gallium oxalato complex  
 lithium battery electrolyte; arsenic antimony  
 oxalato complex lithium battery electrolyte  
 IT Secondary batteries  
 (lithium; nonaq. electrolytes containing  
 oxalato complex salts and sulfones for secondary lithium  
 ion batteries)  
 IT Battery electrolytes  
 (nonaq. electrolytes containing oxalato  
 complex salts and sulfones for secondary lithium ion batteries)  
 IT 77-77-0, Divinylsulfone 83-31-8, 1,8-Naphthosultone  
 1120-71-4, Propanesultone 3289-23-4 3680-02-2, Methyl  
 vinyl sulfone 4430-23-3 21806-61-1 244761-29-3,  
 Lithium bis(oxalato)borate 321201-33-6  
 (nonaq. electrolytes containing oxalato  
 complex salts and sulfones for secondary lithium ion batteries)

L88 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2007:1089655 HCAPLUS [Full-text](#)  
 DOCUMENT NUMBER: 147:389143  
 TITLE: Secondary nonaqueous electrolyte  
 battery

INVENTOR(S): Sato, Koichi; Kitao, Hideki; Kita, Yoshinori  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 9pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2007250440	A	20070927	JP 2006-74762	20060317

PRIORITY APPLN. INFO.: JP 2006-74762 20060317  
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ED Entered STN: 28 Sep 2007

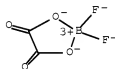
AB The battery has a Li-intercalating cathode, a Li-intercalating anode, and a Li-conductive nonaq. electrolyte solution having an electrolyte salt dissolved in a nonaq. solvent; where the electrolyte solution is added with a Li salt using an oxalate as an anion; and the cathode uses a filamentous carbon as a conductor.

IT 409071-16-5

(cathodes containing filamentous carbon conductors and electrolytes containing lithium oxalate complex salts for secondary lithium batteries)

RN 409071-16-5 HCAPLUS

CN Borate(1-), [ethanedioato(2-)-K01,K02]difluoro-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li+

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 7782-42-5, Graphite, uses

(cathodes containing filamentous carbon conductors and electrolytes containing lithium oxalate complex salts for secondary lithium batteries)

RN 96-49-1 HCAPLUS

CN 1,3-Dioxolan-2-one (CA INDEX NAME)





RN 616-38-6 HCAPLUS  
 CN Carbonic acid, dimethyl ester (CA INDEX NAME)



RN 623-53-0 HCAPLUS  
 CN Carbonic acid, ethyl methyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 7782-42-5 HCAPLUS  
 CN Graphite (CA INDEX NAME)

c

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery cathode carbon fiber conductor;  
 battery electrolyte lithium oxalate complex  
 IT Battery cathodes  
 Battery electrolytes  
 (cathodes containing filamentous carbon conductors and  
 electrolytes containing lithium oxalate complex salts  
 for secondary lithium batteries)  
 IT Carbon fibers, uses  
 (cathodes containing filamentous carbon conductors and  
 electrolytes containing lithium oxalate complex salts  
 for secondary lithium batteries)  
 IT Secondary batteries  
 (lithium; cathodes containing filamentous carbon conductors  
 and electrolytes containing lithium oxalate complex  
 salts for secondary lithium batteries)  
 IT 409071-16-5  
 (cathodes containing filamentous carbon conductors and  
 electrolytes containing lithium oxalate complex salts  
 for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 7782-42-5, Graphite, uses 21324-40-3, Lithium hexafluorophosphate 217309-43-8, Cobalt lithium manganese nickel oxide (Co<sub>0.3</sub>LiMn<sub>0.3</sub>Ni<sub>0.4</sub>O<sub>2</sub>) (cathodes containing filamentous carbon conductors and electrolytes containing lithium oxalate complex salts for secondary lithium batteries)

L88 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2007:865763 HCAPLUS [Full-text](#)

DOCUMENT NUMBER: 147:238796

TITLE: Multilayer electrode materials for use as cathodes and anodes in secondary lithium batteries

INVENTOR(S): Charest, Patrick; Guerfi, Abdelbast; Petitclerc, Michel; Dontigny, Martin; Zaghib, Karim

PATENT ASSIGNEE(S): Hydro-Quebec, Can.

SOURCE: Can. Pat. Appl., 39pp.

CODEN: CPXXEB

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CA 2535064	A1	20070801	CA 2006-2535064	20060201
			<--	
CA 2640173	A1	20070809	CA 2007-2640173	20070131
			<--	
WO 2007087714	A1	20070809	WO 2007-CA141	20070131
			<--	
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW			
RW:	AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GO, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
EP 1984175	A1	20081029	EP 2007-701741	20070131
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R:	AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR			
JP 2009525568	T	20090709	JP 2008-552655	20070131
			<--	
CN 101378897	A	20090304	CN 2007-80004027	20080731
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IN 2008DN07155	A	20081003	IN 2008-DN7155	20080821
			<--	
KR 2008091499	A	20081013	KR 2008-721238	20080829
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US 20090301866	A1	20091210	US 2008-162933	20081205
			<--	

PRIORITY APPLN. INFO.:

CA 2006-2535064

A 20060201

&lt;--

WO 2007-CA141

W 20070131

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered SIN: 08 Aug 2007

AB Multi-layer materials suitable for use as electrodes in electrochem. generators (especially secondary batteries) consist of  $\geq 2$  layers of solids superimposed on each other, each containing electrochem. active material, and having an easy penetration into the other. The cathode configurations include  $\text{LiFePO}_4$ ,  $\text{LiCoO}_2$ ,  $\text{FePO}_4$ ,  $\text{Li}_3\text{PO}_4$ ,  $\text{LiMn}_2\text{O}_4$ ,  $\text{LiNiO}_2$ , and  $\text{LiNi}_{0.33}\text{Co}_{0.33}\text{Mn}_{0.33}\text{O}_2$ ; the anode configurations include graphite or carbon,  $\text{Li}_4\text{Ti}_5\text{O}_{12}$ , Sn, Al, carbon-containing Al, Ag, or Si. The layers are fabricated using a water-soluble binder, such as PVDF or PTFE, a thickener (Na CM-cellulose), and a solvent (e.g., N-methylpyrrolidone or cyclopentanone). The electrodes are useful for batteries with nonaq. electrolytes containing lithium salts.

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 244761-29-3, Lithium bis(oxalato)borate (battery electrolytes; multilayer electrode materials for use as cathodes and anodes in secondary lithium batteries)

RN 96-48-0 HCAPLUS

CN 2(3H)-Furanone, dihydro- (CA INDEX NAME)



RN 96-49-1 HCAPLUS

CN 1,3-Dioxolan-2-one (CA INDEX NAME)



RN 108-32-7 HCAPLUS

CN 1,3-Dioxolan-2-one, 4-methyl- (CA INDEX NAME)



RN 616-38-6 HCAPLUS

CN Carbonic acid, dimethyl ester (CA INDEX NAME)



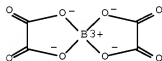
RN 623-53-0 HCAPLUS  
 CN Carbonic acid, ethyl methyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 244761-29-3 HCAPLUS  
 CN Borate(1-), bis[ethanedioato(2-)-κO1,κO2]-, lithium (1:1), (T-4)- (CA INDEX NAME)



IT 7782-42-5, Graphite, uses 12057-17-9,  
 Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt  
 lithium oxide (CoLiO2)  
 (electrode bed material; multilayer electrode materials for use as  
 cathodes and anodes in secondary lithium  
 batteries)

RN 7782-42-5 HCAPLUS  
 CN Graphite (CA INDEX NAME)

c

RN 12057-17-9 HCAPLUS  
 CN Lithium manganese oxide (LiMn2O4) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Mn	2	7439-96-5
Li	1	7439-93-2

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	1	7440-48-4
Li	1	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST multilayer battery electrode electrolyte; battery  
cathode anode multilayer lithium salt  
graphite

IT Polyethers, uses

(binder; multilayer electrode materials for use as cathodes  
and anodes in secondary lithium batteries)

IT Battery anodes

Battery cathodes

Battery electrodes

(multilayer electrode materials for use as cathodes and  
anodes in secondary lithium batteries)

IT Fluoropolymers, uses

(multilayer electrode materials for use as cathodes and  
anodes in secondary lithium batteries)

IT 9004-32-4, Cellogen

(Cellogen, thickener; multilayer electrode materials for use as  
cathodes and anodes in secondary lithium  
batteries)IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene  
carbonate 105-58-8, Diethyl carbonate 108-32-7,  
Propylene carbonate 616-38-6, Dimethyl carbonate  
623-53-0, Ethyl methyl carbonate 872-36-6,

Vinylene carbonate 2832-49-7, Tetraethylsulfamide 7791-03-9,

Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate

21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium

trifluoromethanesulfonate 90076-65-6, LiTFSI 132843-44-8, Lithium

bis(perfluoroethanesulfonyl)imide 171611-11-3 244761-29-3

, Lithium bis(oxalato)borate

(battery electrolytes; multilayer electrode materials for  
use as cathodes and anodes in secondary lithium  
batteries)

IT 9002-84-0, PTFE 9011-14-7, Polymethyl methacrylate 24937-79-9,

Polyvinylidene difluoride 25014-41-9, Polyacrylonitrile

(binder; multilayer electrode materials for use as cathodes  
and anodes in secondary lithium batteries)IT 15365-14-7, Iron lithium phosphate (FeLiPO4)  
(carbon-coated, electrode bed material; multilayer electrode  
materials for use as cathodes and anodes in  
secondary lithium batteries)IT 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses 7440-22-4,  
Silver, uses 7440-31-5, Tin, uses 7440-44-0, Carbon, uses

7782-42-5, Graphite, uses 10045-86-0, Iron phosphate (FePO<sub>4</sub>) 10377-52-3, Lithium phosphate (Li<sub>3</sub>PO<sub>4</sub>) 12031-95-7, Lithium titanium oxide (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 346417-97-8, Cobalt lithium manganese nickel oxide (Co<sub>0.33</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>)

(electrode bed material; multilayer electrode materials for use as cathodes and anodes in secondary lithium batteries)

IT 120-92-3, Cyclopentanone 872-50-4, N-Methylpyrrolidone, uses (solvent; multilayer electrode materials for use as cathodes and anodes in secondary lithium batteries)

L88 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2007:505050 HCAPLUS Full-text

DOCUMENT NUMBER: 146:444961

TITLE: Pentafluorophenyl compounds, their manufacture, nonaqueous electrolytic solutions containing them, and secondary lithium batteries

INVENTOR(S): Abe, Hiroshi; Kuwata, Takaaki; Takase, Manabu

PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 19pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2007112737	A	20070510	JP 2005-304850	20051019
			<--	
PRIORITY APPLN. INFO.:			JP 2005-304850	20051019
			<--	

OTHER SOURCE(S): MARPAT 146:444961

ED Entered STN: 10 May 2007

AB C6F<sub>2</sub>OR<sub>1</sub>OR<sub>2</sub> [I; R<sub>1</sub> = COCO, SO, SO<sub>2</sub>; R<sub>2</sub> = C1-12 (halo)alkyl, C3-12 (halo)cycloalkyl, C2-12 (halo)alkenyl, etc.; when R<sub>1</sub> = COCO, R<sub>2</sub> is aryl-free group] are manufactured by condensation of C6F<sub>5</sub>OH with R<sub>2</sub>OR<sub>1</sub>X (R<sub>1</sub>, R<sub>2</sub> = same as above; X = halo) in the presence of bases. The electrolytic solns. contain I or (C6F<sub>5</sub>O)<sub>n</sub>Y (Y = alkali metal, alkaline earth metal; n = 1, 2), preferably further contain cyclic carbonates and linear carbonates, and more preferably contain vinylene carbonate, 1,3-propanesultone, and/or alkynes. The batteries show high discharge capacity retention after repeated cycles.

IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate (electrolytic solution; manufacture of pentafluorophenyl compounds as additives for nonaq. electrolytic solns. for secondary lithium batteries)

RN 96-49-1 HCAPLUS

CN 1,3-Dioxolan-2-one (CA INDEX NAME)



RN 623-53-0 HCAPLUS

CN Carbonic acid, ethyl methyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS

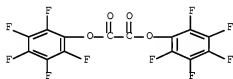
CN 1,3-Dioxol-2-one (CA INDEX NAME)



IT 16536-48-4, Bis(pentafluorophenyl) oxalate  
(manufacture of pentafluorophenyloxy compds. as additives for  
nonaq. electrolytic solns. for secondary lithium batteries)

RN 16536-48-4 HCAPLUS

CN Ethanedioic acid, 1,2-bis(2,3,4,5,6-pentafluorophenyl) ester (CA INDEX NAME)



IT 4755-77-5 5781-53-3

(manufacture of pentafluorophenyloxy compds. as additives for  
nonaq. electrolytic solns. for secondary lithium batteries)

RN 4755-77-5 HCAPLUS

CN Acetic acid, 2-chloro-2-oxo-, ethyl ester (CA INDEX NAME)



RN 5781-53-3 HCAPLUS

CN Acetic acid, 2-chloro-2-oxo-, methyl ester (CA INDEX NAME)



IT 1120-71-4, 1,3-Propanesultone  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 RN 1120-71-4 HCAPLUS  
 CN 1,2-Oxathiolane, 2,2-dioxide (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 25  
 ST pentafluorophenyloxy nonaq electrolytic soln lithium  
 battery; lithium battery electrolyte pentafluorophenyloxy  
 compd manuf  
 IT Carbonates, uses  
 (cyclic or linear; manufacture of pentafluorophenyloxy compds. as  
 additives for nonaq. electrolytic solns. for secondary  
 lithium batteries)  
 IT Secondary batteries  
 (lithium; manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 IT Battery electrolytes  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl  
 methyl carbonate 872-36-6, Vinylene carbonate  
 61764-71-4, Methyl propargyl carbonate  
 (electrolytic solution; manufacture of pentafluorophenyloxy compds. as  
 additives for nonaq. electrolytic solns. for secondary  
 lithium batteries)  
 IT 96157-57-2P 934750-96-6P 934750-99-9P 934751-01-6P  
 934751-04-9P  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 IT 16536-48-4, Bis(pentafluorophenyl) oxalate  
 108534-96-9, Lithium pentafluorophenoxide  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 IT 79-37-8, Oxalyl chloride 107-19-7, Propargyl alcohol 771-61-9,  
 Pentafluorophenol 4755-77-5 5781-53-3  
 7719-09-7, Thionyl chloride 32315-10-9, Triphosgene  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)  
 IT 1120-71-4, 1,3-Propanesultone  
 (manufacture of pentafluorophenyloxy compds. as additives for  
 nonaq. electrolytic solns. for secondary lithium batteries)

L88 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2007:133820 HCAPLUS [Full-text](#)  
 DOCUMENT NUMBER: 146:209740  
 TITLE: Additive for enhancing the performance of  
 electrochemical cells  
 INVENTOR(S): Jow, T. Richard; Zhang, Shengshui; Xu, Kang  
 PATENT ASSIGNEE(S): The United States of America as Represented by the



SOURCE: Secretary of the Army, USA  
U.S., 12pp.  
CODEN: USXXAM  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 7172834	B1	20070206	US 2003-625686	20030724
			<--	
US 7524579	B1	20090428	US 2006-642655	20061221
			<--	
PRIORITY APPLN. INFO.:			US 2002-398712P	P 20020729
			<--	
			US 2003-625686	A3 20030724
			<--	

ED Entered STN: 07 Feb 2007

AB A lithium battery includes an electrolyte comprised of a non-aqueous solvent, and a salt mixture. The salt mixture includes an alkali metal electrolyte salt and an additive salt having an anion of a mixed anhydride of oxalic acid and boric acid. Specific additive salts include lithium bis(oxalato) borate and lithium oxalyldifluoroborate. Particular electrolyte salts comprise LiPF<sub>6</sub> and LiBF<sub>4</sub>. The additive salt is present in an amount of 0.1-60 mol percent of the total of the additive salt and electrolyte salt content of the electrolyte. Also disclosed is a method for enhancing the performance characteristics of a lithium battery through the use of the electrolyte composition. Also disclosed is the compound lithium oxalyldifluoroborate.

IT 96-48-0,  $\gamma$ -Butyrolactone  
(additive for enhancing performance of electrochem. cells)  
RN 96-48-0 HCAPLUS  
CN 2(3H)-Furanone, dihydro- (CA INDEX NAME)



IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 7782-42-5, Graphite, uses 244761-29-3, Lithium bis(oxalato)borate 409071-16-5  
(additive for enhancing performance of electrochem. cells)  
RN 96-49-1 HCAPLUS  
CN 1,3-Dioxolan-2-one (CA INDEX NAME)



RN 108-32-7 HCAPLUS  
CN 1,3-Dioxolan-2-one, 4-methyl- (CA INDEX NAME)



RN 616-38-6 HCAPLUS  
 CN Carbonic acid, dimethyl ester (CA INDEX NAME)



RN 623-53-0 HCAPLUS  
 CN Carbonic acid, ethyl methyl ester (CA INDEX NAME)



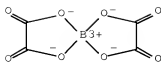
RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 7782-42-5 HCAPLUS  
 CN Graphite (CA INDEX NAME)

C

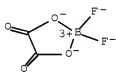
RN 244761-29-3 HCAPLUS  
 CN Borate(1-), bis[ethanedioato(2-)-κO1,κO2]-, lithium (1:1), (T-4)- (CA INDEX NAME)



● Li<sup>+</sup>

RN 409071-16-5 HCAPLUS

CN Borate(1-), [ethanedioato(2-)-K01,K02]difluoro-, lithium  
(1:1), (T-4)- (CA INDEX NAME)



● Li<sup>+</sup>

INCL 429188000; 429199000; 429329000; 429332000; 252519200

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Battery electrolytes

(additive for enhancing performance of electrochem. cells)

IT 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone  
105-37-3, Ethyl propionate 105-54-4, Ethyl butyrate 105-66-8,  
Propyl butyrate 108-21-4, IsoPropyl acetate 109-60-4, Propyl  
acetate 123-86-4, Butyl acetate 141-78-6, Ethyl acetate, uses  
554-12-1, Methyl propionate 623-42-7, Methyl butyrate 637-78-5,  
Isopropyl propionate 638-11-9, IsoPropyl butyrate

(additive for enhancing performance of electrochem. cells)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
108-32-7, Propylene carbonate 463-79-6D, Carbonic acid,  
ester 616-38-6, Dimethyl carbonate 623-53-0,  
Ethyl methyl carbonate 623-96-1, Dipropyl carbonate  
872-36-6, Vinylene carbonate 2923-17-3 2923-20-8  
4437-85-8, Butylene carbonate 7782-42-5, Graphite  
, uses 7791-03-9, Lithium perchlorate 14283-07-9, Lithium  
tetrafluoroborate 14485-20-2, Lithium tetraphenylborate  
21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium triflate  
35363-40-7, Ethyl propyl carbonate 56525-42-9, Methyl propyl  
carbonate 90076-65-6 115028-88-1 132404-42-3  
244761-29-3, Lithium bis(oxalato)borate  
409071-16-5

(additive for enhancing performance of electrochem. cells)

OS.CITING REF COUNT: 5 THERE ARE 5 CAPLUS RECORDS THAT CITE THIS  
RECORD (5 CITINGS)

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN THE  
RE FORMAT

L88 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2005:963640 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:251038  
 TITLE: Lithium secondary battery  
 INVENTOR(S): Fujihara, Toyoki; Takeda, Kazuhisa; Kitao, Hideki;  
 Ikemachi, Takaaki; Nohma, Toshiyuki; Nakanishi,  
 Naoya  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050191553	A1	20050901	US 2005-66225	20050225
			<--	
US 7416813	B2	20080826		
JP 2005243504	A	20050908	JP 2004-53672	20040227
			<--	
JP 2006196250	A	20060727	JP 2005-4851	20050112
			<--	
CN 1661846	A	20050831	CN 2005-10052847	20050225
			<--	
CN 100449850	C	20090107		
KR 2006042201	A	20060512	KR 2005-15654	20050225
			<--	
PRIORITY APPLN. INFO.:			JP 2004-53672	A 20040227
			<--	
			JP 2005-4851	A 20050112
			<--	

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 02 Sep 2005  
 AB A lithium secondary battery is provided with a pos. electrode, a neg. electrode, and a non-aqueous electrolyte prepared by dissolving a solute in a non-aqueous solvent wherein a pos. electrode active material of the pos. electrode is composed of lithium-manganese composite oxide having a spinel structure and lithium-transition metal composite oxide having a layer structure containing at least nickel and lithium salt having oxalato complex as anion is admixed to the non-aqueous electrolyte.  
 IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate 7782-42-5, Graphite, uses 244761-29-3, Lithium bisoxalatoborate (lithium secondary battery)  
 RN 96-49-1 HCAPLUS  
 CN 1,3-Dioxolan-2-one (CA INDEX NAME)



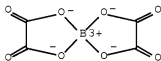
RN 623-53-0 HCAPLUS  
 CN Carbonic acid, ethyl methyl ester (CA INDEX NAME)



RN 7782-42-5 HCAPLUS  
CN Graphite (CA INDEX NAME)

C

RN 244761-29-3 HCAPLUS  
CN Borate(1-), bis[ethanedioato(2-)-κO1,κO2]-, lithium (1:1),  
(T-4)- (CA INDEX NAME)



IT 872-36-6, Vinylene carbonate  
(lithium secondary battery)  
RN 872-36-6 HCAPLUS  
CN 1,3-Dioxol-2-one (CA INDEX NAME)



IC ICM H01M004-52  
ICS H01M010-40  
INCL 429231100; 429223000; 429326000; 429330000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl  
methyl carbonate 7782-42-5, Graphite, uses  
21324-40-3, Lithium hexafluorophosphate 155472-68-7, Lithium  
manganese oxide (Li1.1Mn1.9O4) 217309-43-8, Cobalt lithium manganese  
nickel oxide (Co0.3LiMn0.3Ni0.4O2) 244761-29-3, Lithium  
bisoxalatoborate 346417-97-8, Cobalt lithium manganese nickel oxide  
(Co0.33LiMn0.33Ni0.33O2)  
(lithium secondary battery)  
IT 872-36-6, Vinylene carbonate 3741-38-6, Ethylene sulfite  
4427-96-7, Vinyl ethylene carbonate 114435-02-8, Fluoroethylene  
carbonate  
(lithium secondary battery)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L88 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2001:617337 HCAPLUS Full-text

DOCUMENT NUMBER: 135:168881

TITLE: Secondary nonaqueous electrolyte batteries

INVENTOR(S): Oki, Shunsuke; Misao, Takashi; Koizumi, Hiroyuki

PATENT ASSIGNEE(S): Asahi Chemical Industry Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.  
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
JP 2001229964	A	20010824	JP 2000-37169	20000215
			<--	
PRIORITY APPLN. INFO.:			JP 2000-37169	20000215
			<--	

ED Entered STN: 24 Aug 2001

AB The batteries have a cathode, an anode, a separator between the electrodes, and a nonaq. electrolyte solution in a battery case; where the electrolyte solution contains  $\geq 0.1\%$  vinylene carbonate and the battery contains Li oxalate, at an amount satisfying  $(0.5\text{Liox/Lica}) = 0.01\text{--}0.1$  (Liox and Li ca are the mol of Li in the oxalate and in the battery cathode, resp.) before initial charge.

IT 553-91-3, Lithium oxalate  
(anodes containing lithium oxalate for secondary lithium batteries using electrolyte solns. containing vinylene carbonate)

RN 553-91-3 HCAPLUS

CN Ethanedioic acid, lithium salt (1:2) (CA INDEX NAME)



● 2 Li

IT 96-48-0,  $\gamma$ -Butyrolactone  
(electrolyte solns. containing vinylene carbonate for secondary lithium batteries using anodes containing lithium oxalate)

RN 96-48-0 HCAPLUS

CN 2(3H)-Furanone, dihydro- (CA INDEX NAME)



IT 872-36-6, vinylene carbonate  
 (electrolyte solns. containing vinylene carbonate for  
 secondary lithium batteries using anodes containing lithium  
 oxalate)  
 RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery electrolyte solvent vinylene  
 carbonate; lithium oxalate secondary lithium battery  
 additive  
 IT Battery anodes  
 (anodes containing lithium oxalate for secondary  
 lithium batteries using electrolyte solns. containing  
 vinylene carbonate)  
 IT Battery electrolytes  
 (electrolyte solns. containing vinylene carbonate for  
 secondary lithium batteries using anodes containing lithium  
 oxalate)  
 IT Carbon fibers, uses  
 (graphite; anodes containing lithium  
 oxalate for secondary lithium batteries using  
 electrolyte solns. containing vinylene carbonate)  
 IT Secondary batteries  
 (lithium; secondary lithium batteries using electrolyte  
 solns. containing vinylene carbonate and anodes containing  
 lithium oxalate)  
 IT 553-91-3, Lithium oxalate  
 (anodes containing lithium oxalate for secondary  
 lithium batteries using electrolyte solns. containing  
 vinylene carbonate)  
 IT 96-48-0,  $\gamma$ -Butyrolactone 14283-07-9, Lithium  
 fluoroborate 21324-40-3, Lithium hexafluorophosphate  
 (electrolyte solns. containing vinylene carbonate for  
 secondary lithium batteries using anodes containing lithium  
 oxalate)  
 IT 872-36-6, vinylene carbonate  
 (electrolyte solns. containing vinylene carbonate for  
 secondary lithium batteries using anodes containing lithium  
 oxalate)

=> d his nofile

(FILE 'HOME' ENTERED AT 08:26:22 ON 18 MAR 2010)

FILE 'HCAPLUS' ENTERED AT 08:26:33 ON 18 MAR 2010

L1 1 SEA SPE=ON ABB=ON PLU=ON US20060246356/PN  
SEL RN

FILE 'REGISTRY' ENTERED AT 08:26:46 ON 18 MAR 2010

L2 24 SEA SPE=ON ABB=ON PLU=ON (105-58-8/BI OR 108-32-7/BI OR  
108-59-8/BI OR 1120-71-4/BI OR 12057-17-9/BI OR 12190-79-3/  
BI OR 14283-07-9/BI OR 2050-60-4/BI OR 20602-87-3/BI OR  
20760-45-6/BI OR 21324-40-3/BI OR 5132-19-4/BI OR 553-90-2/  
BI OR 615-52-1/BI OR 616-38-6/BI OR 61764-71-4/BI OR  
623-53-0/BI OR 7782-42-5/BI OR 841302-60-1/BI OR 841302-61-  
2/BI OR 841302-62-3/BI OR 872-36-6/BI OR 96-48-0/BI OR  
96-49-1/BI)

L3 4 SEA SPE=ON ABB=ON PLU=ON L2 AND LI/ELS

L4 12592 SEA SPE=ON ABB=ON PLU=ON ?OXALAT?/CNS

L5 6 SEA SPE=ON ABB=ON PLU=ON L4 AND L2

L6 STR

L7 50 SEA SSS SAM L6

L8 STR L6

L9 5 SEA SSS SAM L8

L10 STR L8

L11 2 SEA SSS SAM L10

L12 18 SEA SPE=ON ABB=ON PLU=ON L2 AND ESTER?

L13 15 SEA SPE=ON ABB=ON PLU=ON L12 NOT 1-100/NR

L14 STR L10

L15 1 SEA SSS SAM L14

L16 STR L14

L17 1 SEA SSS SAM L16

L18 593 SEA SSS FUL L16

L19 9 SEA SPE=ON ABB=ON PLU=ON L2 AND L18  
SAV L18 WEI902/A  
E 1,3-PROPANE SULTONE/CN

L20 1 SEA SPE=ON ABB=ON PLU=ON "1,3-PROPANE SULTONE"/CN  
E VINYLENE CARBONATE/CN

L21 1 SEA SPE=ON ABB=ON PLU=ON "VINYLENE CARBONATE"/CN  
E METHYL ETHYL OXALATE/CN

L22 1 SEA SPE=ON ABB=ON PLU=ON "METHYL ETHYL OXALATE"/CN  
E METHYL PROPYL OXALATE/CN

L23 1 SEA SPE=ON ABB=ON PLU=ON "METHYL PROPYL OXALATE"/CN  
E METHYL BUTYL OXALATE/CN  
E METHYLBUTYL OXALATE/CN

L24 0 SEA SPE=ON ABB=ON PLU=ON L18 AND C7 H1204/MF

L25 7 SEA SPE=ON ABB=ON PLU=ON L18 AND C7H1204/MF

L26 6 SEA SPE=ON ABB=ON PLU=ON L25 AND METHYL?

L27 43 SEA SPE=ON ABB=ON PLU=ON L18 AND HEXYL?

L28 11 SEA SPE=ON ABB=ON PLU=ON L27 AND METHYL?

L29 0 SEA SPE=ON ABB=ON PLU=ON L27 AND 1-METHYL?

L30 5 SEA SPE=ON ABB=ON PLU=ON L27 AND 2-METHYL?

L31 15 SEA SPE=ON ABB=ON PLU=ON L18 AND HEPTYL?

L32 13 SEA SPE=ON ABB=ON PLU=ON L18 AND OCTYL?

L33 8 SEA SPE=ON ABB=ON PLU=ON L18 AND NONYL?

L34 8 SEA SPE=ON ABB=ON PLU=ON L18 AND DECYL?

L35 8 SEA SPE=ON ABB=ON PLU=ON L18 AND UNDECYL?

L36 11 SEA SPE=ON ABB=ON PLU=ON L18 AND DODECYL?



E METHYL ETHYL CARBONATE/CN  
 L37 1 SEA SPE=ON ABB=ON PLU=ON "METHYL ETHYL CARBONATE"/CN  
 E PROPYLENE CARBONATE/CN  
 L38 1 SEA SPE=ON ABB=ON PLU=ON "PROPYLENE CARBONATE"/CN  
 E DIMETHYL CARBONATE/CN  
 L39 1 SEA SPE=ON ABB=ON PLU=ON "DIMETHYL CARBONATE"/CN  
 E ETHYLENE CARBONATE/CN  
 L40 1 SEA SPE=ON ABB=ON PLU=ON "ETHYLENE CARBONATE"/CN  
 E METHYL ETHYL CARBONATE/CN  
 L41 1 SEA SPE=ON ABB=ON PLU=ON "METHYL ETHYL CARBONATE"/CN  
 E ETHYLENE CARBONATE/CN  
 L42 1 SEA SPE=ON ABB=ON PLU=ON "ETHYLENE CARBONATE"/CN  
 E GAMMA-BUTYROLACTONE/CN  
 E BUTYROLACTONE/CN  
 L43 1 SEA SPE=ON ABB=ON PLU=ON BUTYROLACTONE/CN  
 E COLIO2/MF  
 L44 1 SEA SPE=ON ABB=ON PLU=ON COLIO2/MF  
 L45 1 SEA SPE=ON ABB=ON PLU=ON LIMN204/MF  
 E LINIO2/MF  
 L46 1 SEA SPE=ON ABB=ON PLU=ON LINIO2/MF  
 L47 462 SEA SPE=ON ABB=ON PLU=ON (LI(L)CO(L)NI(L)O)/ELS(L)4/ELC.  
 SUB  
 L48 QUE SPE=ON ABB=ON PLU=ON (L37 OR L38 OR L39 OR L40 OR  
 L41 OR L42 OR L43 OR L44 OR L45 OR L46)  
 E GRAPHITE/CN  
 L49 1 SEA SPE=ON ABB=ON PLU=ON GRAPHITE/CN  
  
 FILE 'HCAPLUS' ENTERED AT 10:00:09 ON 18 MAR 2010  
 L50 231065 SEA SPE=ON ABB=ON PLU=ON L49 OR GRAPHITE#  
 L51 1607 SEA SPE=ON ABB=ON PLU=ON L21  
 L52 2339 SEA SPE=ON ABB=ON PLU=ON L20  
 L53 42946 SEA SPE=ON ABB=ON PLU=ON (L37 OR L38 OR L39 OR L40 OR  
 L41 OR L42 OR L43 OR L44 OR L45 OR L46)  
 L54 1790 SEA SPE=ON ABB=ON PLU=ON L47  
 L55 6008 SEA SPE=ON ABB=ON PLU=ON L18  
 L56 QUE SPE=ON ABB=ON PLU=ON ELECTROLYTE#  
 L57 QUE SPE=ON ABB=ON PLU=ON NONAQUEOUS? OR NON AQUEOUS?  
 L58 QUE SPE=ON ABB=ON PLU=ON L22 OR L23 OR (L26 OR L27 OR  
 L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR L35 OR  
 L36)  
 L59 3 SEA SPE=ON ABB=ON PLU=ON L56 AND L57 AND L58  
 L60 14 SEA SPE=ON ABB=ON PLU=ON L56 AND L57 AND L55  
 L61 14 SEA SPE=ON ABB=ON PLU=ON L59 OR L60  
 L62 6 SEA SPE=ON ABB=ON PLU=ON L61 AND L52  
 L63 4 SEA SPE=ON ABB=ON PLU=ON L62 AND L51  
 L64 14 SEA SPE=ON ABB=ON PLU=ON (L59 OR L60 OR L61 OR L62 OR  
 L63)  
 L65 QUE SPE=ON ABB=ON PLU=ON (L44 OR L45 OR L46 OR L47)  
 L66 3 SEA SPE=ON ABB=ON PLU=ON L64 AND L65  
 L67 4 SEA SPE=ON ABB=ON PLU=ON L64 AND L50  
 L68 QUE SPE=ON ABB=ON PLU=ON ANODE# OR NEGATIVE ELECTRODE#  
 L69 QUE SPE=ON ABB=ON PLU=ON CATHODE# OR POSITIVE ELECTRODE#  
  
 L70 14 SEA SPE=ON ABB=ON PLU=ON L64 OR L66 OR L67  
 L71 7 SEA SPE=ON ABB=ON PLU=ON L70 AND (L68 OR L69)  
 L72 14 SEA SPE=ON ABB=ON PLU=ON L70 OR L71  
 L73 15561 SEA SPE=ON ABB=ON PLU=ON L56 AND L57  
 L74 164 SEA SPE=ON ABB=ON PLU=ON L73 AND OXALAT?  
 L75 32 SEA SPE=ON ABB=ON PLU=ON L74 AND L51  
 L76 10 SEA SPE=ON ABB=ON PLU=ON L75 AND L52

# 10/567,902

L77	15	SEA	SPE=ON	ABB=ON	PLU=ON	L75 AND L50
L78	12	SEA	SPE=ON	ABB=ON	PLU=ON	L77 AND L68 AND L69
L79	13	SEA	SPE=ON	ABB=ON	PLU=ON	L74 AND L52
L80	26	SEA	SPE=ON	ABB=ON	PLU=ON	(L76 OR L77 OR L78 OR L79)
L81	20	SEA	SPE=ON	ABB=ON	PLU=ON	L80 NOT L72
L82	84095	SEA	SPE=ON	ABB=ON	PLU=ON	L4
L83	19	SEA	SPE=ON	ABB=ON	PLU=ON	L82 AND L81
L84	0	SEA	SPE=ON	ABB=ON	PLU=ON	L81 AND L66
L85	17	SEA	SPE=ON	ABB=ON	PLU=ON	L81 AND L53
L86	20	SEA	SPE=ON	ABB=ON	PLU=ON	L81 OR L83 OR L84 OR L85
L87	14	SEA	SPE=ON	ABB=ON	PLU=ON	L72 AND (1840-2006)/PRY,AY,PY
L88	8	SEA	SPE=ON	ABB=ON	PLU=ON	L86 AND (1840-2006)/PRY,AY,PY